SINCLAIR

QL WORLD

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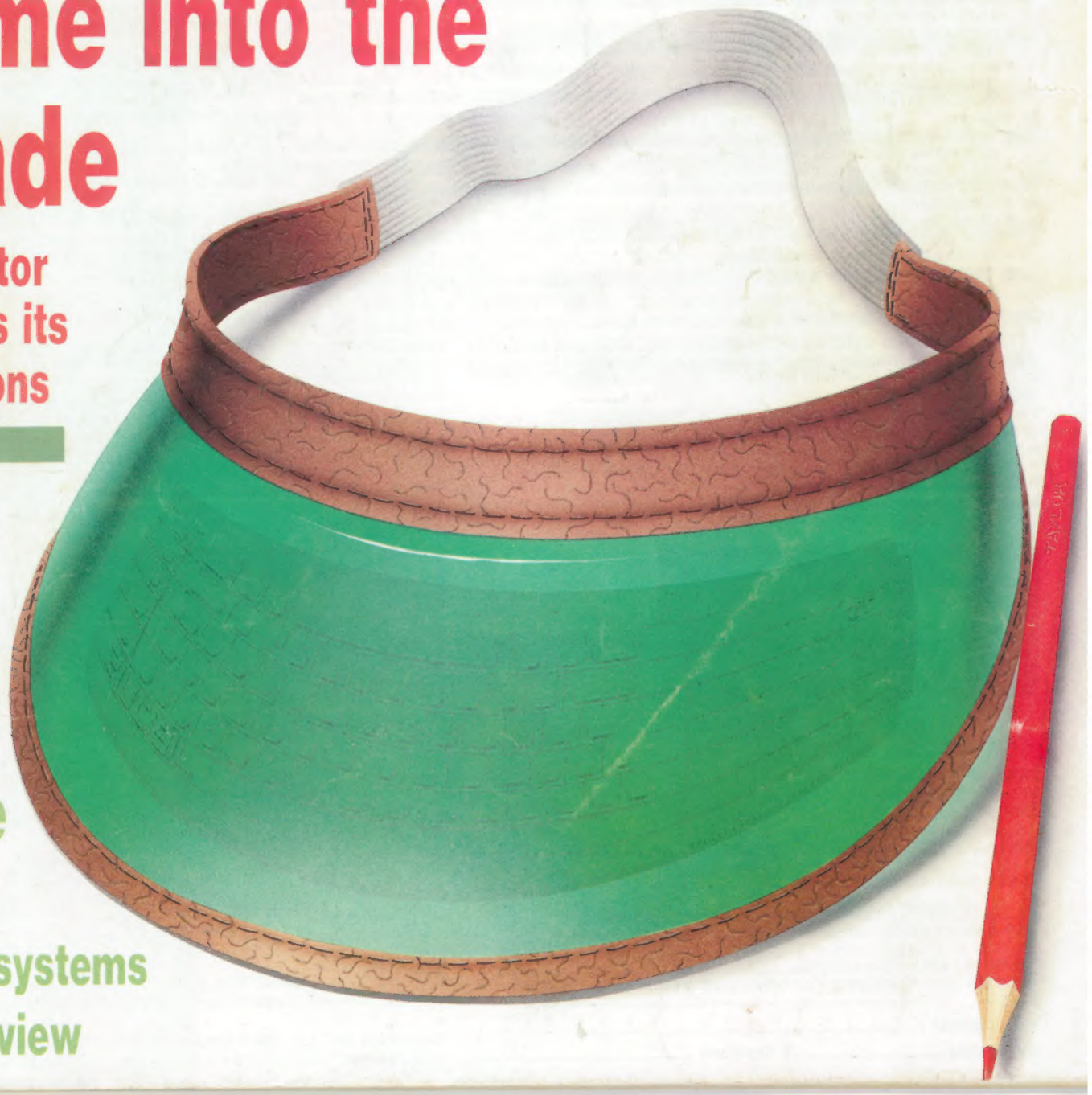
DM 5.00

DIY Toolkit — Promises unbroken

Come into the shade

The Editor expands its operations



Out of the Shell

Expert systems shell review

Introducing QTALK

TEXT TO SPEECH IN A FLASH

PRICE

Qtalk	£75.00
VAT	£11.25
Post/Packaging	£ 2.25
Total	£88.50

Qtalk Applications

1) **Health**
   - a viable solution to speech impairment/impediment
   - allows the blind to write documents and programs
2) **Education**
   - an excellent tool for teaching the relationship between the written and the spoken word
   - a valuable aid to those assisting the dyslexic or for students with reading problems
   - an amazing new method for teaching or learning the translation of one language to another
   - touch typing made easy with keyboard echo
3) **Industry**
   - enables verbal output of readings/warnings from independent peripherals. (BUS, IEEE, RS232 etc)
   - can be used to give instructions to an operator
   - could be set up as an answerphone or entryphone
4) **Entertainment**
   - allows the user to verbally list programs while checking them against a hardcopy listing
   - can be made to hum musical tunes
   - provides a whole new dimension to computer games

Hardware Features

RS232C, Selectable baud rate, DCE or DTE
- will operate on any computer with an RS232 port
- at any standard baud rate
- does not tie up the expansion port

Three adjustable presets:
- allows adjustment of Volume, Pitch and Pitch range (16 levels)

Black Eurocard enclosure, QL plug, power lead, socket and serial cable
- simply plugs in between your power supply and QL
- maintains the integrity of your computer system

(Note. CST Thor version is powered through the serial lead)

Software Features

Full 68000 Text To Speech software incorporating 16 levels of pitch.
- lightning fast conversion of any string into speech
- any multi syllable word may be split, with different syllables spoken at differing levels of pitch, allowing intonation
- 20K of code. Will work on standard (128K) machine and Thor

Built in Exception Table (BET)
- certain words defy all logic and no amount of rules can cater for these. Therefore, their pronounciation has been permanently set in an exception table. eg 'thorough', 'ghoti', 'Lbytes', 'flp1'

Size selectable User Exception Table (UET)
- Users can set up their own table of any size and fill it with their own words/pronounciations. This overrides words in the built in table therefore allowing translation of languages. This table can be saved and reloaded for later use.

Over 400 rules to convert text to speech.
- If the word or string is not found in either table it will be pronounced via a sophisticated set of rules.

Full Device driver implementation.
- a new device called 'QTK' is added to the QL's list of devices. This means that you can use all of the built in basic keywords to send information to QTALK. eg PRINT, LIST, DIR, COPY etc. and also use QTALK with other computer languages (PASCAL, FORTRAN etc)
- a set of clever superbasic extensions is also included to make QTALK a breeze to use
- may be set to pronounce or ignore punctuation

Multitasking screen editor
- can be called up any time to set up and add, alter or delete words from the User exception table. Comprehensive on screen help.
- Hopefully the last word in QL clocks — talking time and date

Many more thoroughly documented features

ALIEN HIJACK

The year is 2003 and you are working on the S.P.C. Forward, as ship's engineer. On the 23rd day you are attacked by an alien space ship and all hell breaks loose. You must regain control of your ship, against some mighty tough opposition.

The first TALKING game for the Sinclair QL. Possibly the most amazing QL graphics seen to date

- 3D graphics
- Full 68000 code
- 192 colour screens
- fast, dynamic, challenging
- talking hero and aliens

Note. Alien Hijack does not require QTALK to run but it certainly makes it a lot more fun. Works on a 128K QL.

PRICE

Alien Hijack	£15.00
VAT	£ 2.25
Post/Packaging	£ 1.00
Total	£18.25

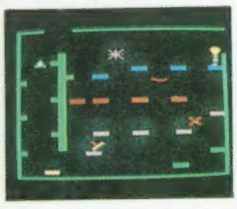
PUZZLE MANIA

Your mission, should you decide to accept, is to journey about the danger ridden cells of Maniaville to retrieve the lost loot of Lawless Lenny. Several obstacles will attempt to thwart your progress and only the smartest gamer will survive.

The second TALKING game for the Sinclair QL

- full 68000 code — 40 colour screens — fast, arcade action
- spoken clues to help you win (if you are good enough)
- Truly addictive challenge

Note. Puzzle Mania can operate without QTALK but is much more fun with it.



PRICE

Puzzle Mania	£10.00
VAT	£ 1.50
Post/Packaging	£ 1.00
Total	£12.50

Special Introductory Offer

Buy QTALK, PUZZLE MANIA and ALIEN HIJACK and receive £5.00 discount pre VAT total

SQLW 3

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with software on 3½" **disc/mdv** (cross out one which does not apply)

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or please debit my **Access/Visa card** (cross out one which does not apply)

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(New Zealand)

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CONTENTS

MARCH 1988

7 QL SCENE ● News from the QL market
10 OPEN CHANNEL ● Your chance to speak out
14 TROUBLE SHOOTER ● A problem aired and a problem solved
16 EXPERT SYSTEM SHELL ● First to be available for the QL
20 SUPERBASIC ● Start of a major new project
26 EDUCATION ● Non-academic, practical applications
29 THE EDITOR ● Now with document-handling facility
36 AI DRAUGHTS ● The next step is intelligence
42 D.I.Y. TOOLKIT ● Fulfilment of a promised command
46 PROGRAM OF THE MONTH ● Intercept the enemy with Radar
50 FOCUS SALES POINT ● QL shoppers' paradise
54 MICRODRIVE EXCHANGE ● Only the best

NEXT MONTH

NEW OWNER'S GUIDE
For anyone taking their first steps into the world of the QL, and computers in general.

COMPETITION
Win a colour monitor specially designed to complement the QL in this simple test.

TURBO V2.0

Turbo V2.0 is the very latest version of Digital Precision's acknowledged world-beating compiler. SuperBasic programs compiled with Turbo can run 100 times faster! Ever since its release just over a year ago Turbo has astounded the pundits and amazed its users not just by its speed, but by its incredible flexibility and, in combination with the Turbo Toolkit, its vast array of powerful commands.

Turbo v2.0 has a totally reworked front-end user interface, allowing a huge number of compile options and - amazingly - a setting for how good a programmer you are! User configurable in advance and at runtime. Helpful error messages supplement the 350 page user encyclopaedia. Features smart auto-correction - Turbo is tolerant!

Turbo Toolkit now provides 200 additional commands, procedures and functions to increase the power of Superbasic, nearly all of which are available under the interpreter and Turbo. Turbo Toolkit is RAM-based and can be used as a stand alone utility or to complement existing toolkits such as Supertoolkit - it costs £29.95 by itself. For a full feature - list see our ad in the January '88 issue of QL World.

D P Classic

Turbo V2.0 system including Turbo Toolkit £99.95.

Upgrade Supercharge to Turbo for £65 - return mdv, manual and lenslok .

DIGITAL PRECISION

A PRIDE IN ITS LOGIC

3D PRECISION

NEW!

At last, a 3D modelling and CAD graphics package that truly does justice to the QL's potential

3D CAD on the QL has always been either too slow or too crude to be of any practical value - until 3D Precision. 3D Precision is a full featured, menu driven 3D designer and toolkit which enables you to easily produce professional looking 3D designs and drawings: there is no requirement for uniform cross sections and no restrictions on minimum step size.

3D PRECISION permits continuous, pre-programmed and co-ordinate based drawing with pan, scroll and rotate about any axis, at astounding speed. Functions include recolour, rescale, recentre, zoom, edit, stretch and reposition. Perspective is continuously adjustable by zooming, translation and rotation of the 'camera'. Fully rubber banded autogeometrics are provided.

3D PRECISION comes with an easy to use toolkit which adds 100+ commands to SuperBasic and machine code. It's fast enough for animation, and gives you all the effects and controls you've dreamed of.

3D PRECISION provides advanced users with facilities for artistic/technical modelling, conceptualisation and manipulation in 3D. Needs at least 256K Ram expansion.

3D Precision complete with toolkit and manual — only £49.9

D P Classic

THE EDITOR

"Superb...it exceeds feature specifications found even in the best word processors"

Sinclair QL World.

D P Classic

At last a word processor for the QL with truly professional facilities. The Editor is a word, text, character and file processing system of very superior capabilities. With 200 commands, very high speed and great flexibility, The

Existing users - upgrade to Special Edition Editor for only £25

Editor handles text files, Quill files, programs in SuperBasic and other languages, data files, screens, object files etc. Editor natively multitasks. A comprehensive configurator gives you total control over fonts, system defaults, colours, cursor speed, sizes...For a full feature list see QL World Dec. '87 issue.

The Editor V1.17, which works on any QL,

EDITOR V1.17 £29.95

SPECIAL EDITOR V2.05 £49.95

comes with a comprehensive 90 page book. The Special Edition Editor V2.05 requires a minimum 128K extra RAM, has 40% more commands and a new 160 page manual. It's the last word.

D P Classic

EYE-Q

The definitive QL graphics/CAD syste

Eye-Q is the definitive graphics package for the QL.

Eye-Q is a program which will enable you to make the most of your artistic/design talents via an unequalled array of features and "drawing aids", an intelligent (and highly consistent) user interface with pop-up menus. In Eye-Q, the same keys do the same things whichever option is selected: anything that can be done to the whole screen can be done to any part of it.

Eye-Q is 100% handwritten machine co this gives it unsurpassed smoothness.

With fully comprehensive A4 manua

£29.95

DESKTOP PUBLISHER

A full function DTP system for the QL with 256K RAM expansion.

Acknowledged by the press to be equal to anything available on a home micro, Desktop Publisher incorporates many of the features found on professional DTP systems costing many thousands of pounds. Desktop Publisher will give you the power to produce sophisticated documents; it will tackle anything from leaflets and posters to brochures, catalogues and newsletters. Desktop Publisher costs £59.95.

Desktop Publisher Special Edition is an enhanced, more powerful version for QL configurations with 512K RAM and a disk drive. It will enable the ambitious user to create more professional looking documents more easily.. Full feature list in QL World Dec. '87 issue.

It is recommended that DTP is used with quality WP and graphics software.

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SPECIAL EDITION DTP & EYE-Q	**£104.95**
SPECIAL EDITION DTP & SPECIAL EDITOR	**£114.95**
SPECIAL EDITION DTP, SPECIAL EDITOR & EYE-Q	**£139.95**

DEDUCT £20 FOR STANDARD DTP

D P Classic

MICROBRIDGE

Microbridge is a superb contract bridge bidding and playing program which can also teach bidding in a series of sixteen lessons used in conjunction with a brilliant manual.

The tutor is followed up with a virtually unlimited set of hands for further practice in bidding and play. Lots of fun.

Microbridge is one of the strongest bridge programs available for any computer. It understands many of the subtle elements of card play and never cheats by peeping at hidden hands. This makes it a challenge for skilled players as well as a non-abusive instructress for beginners. Microbridge's fluent commentary is a first in computing.

Microbridge needs 256K RAM expansion and costs £34.95
"Ten out of ten" - QL World

SUPER SPRITE GENERATOR

The ultimate tool for the creation of high quaility high speed sprites, whether for fast action/adventure games or serious applications. Now the truly professional tricks of the top games programmers can be recreated with no machine code knowledge required on your part.

- 100% flicker free
- real time collision detection
- comprehensive diagnostics with error trapping
- Up to 256 multicoloured sprites and planes
- 16 frame animation

"The results that can be achieved are simply excellent" is what QL User said way back in 1985. Now with many more new enhancements.

£29.95 complete

£5 off if V4.0 bought with something else.

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Frustration with corrupted data? Never want the experience? SMM provides everything you are ever likely to need in one integrated menu-driven package - and it's not just for when things go wrong.

- Copy any (yes, ANY) disk or cartridge
- Sector loading, copying and editing.
- Auto file recovery ● Directory sort
- String searching ● Hardware diagnostics
- Direct file copying from other disk for mats i.e. PC-DOS, MS-DOS, CP/M etc.
- Text file translation utility.

"The definitive blockbuster... includes every possible facility"

ONLY £39.95 Cartridge only version £24.95

SUCCESS - The Supreme CP/M Code Emulation System

Now with automatic CP/M-type disc recognition system!

NEW!

☐ CP/M is the most widely implemented operating system. Famous programs like Wordstar, Supercalc, Symphony, Lotus 1-2-3, dBase and Perfect Writer, and a huge library of public domain software, is available to run under CP/M.

☐ QL owners can break into this program bank using Success. Success stands for Supreme CP/M Code Emulation System. No knowledge of CP/M is required. A disk drive is necessary only for the original program transfer.

☐ Success is much more than just a CP/M emulator. It has full QDOS file handling, ED line editor, 8080 assembler, PIP copier, creation of executable CP/M and all the CP/M utilities. What distinguishes Success is its absolutely phenomenal speed.

☐ Success is designed for beginners, but the manual also contains detailed guidance for those who want to access CP/M and QDOS at machine code level. The extensive manual contains full details of where you can get cheap CP/M programs. Open up your QL to the enormous potential of CP/M NOW.

Nothing succeeds like Success - only £49.95

PROFESSIONAL ASTROLOGER

The most advanced, accurate and extensive astrology package yet produced for any home micro. Professional Astrologer is suitable for those with advanced astrological knowledge, but can be used equally well by curious amateurs.

The program offers the most complete readout possible including ten pages of personality/character delineation, six pages of day-to -day and year-to year personalised text predictions and three pages of 'synastric' text comparisons between two people. These are just some of the astrological features offered:

● Transits ● Progressions ● Seven house systems ● Individually adjustable orbs ● 158 birth data files ● Eclipses ● Closing aspect indicator

Professional Astrologer can be supplied with its complementary program; Professional Astronomer. This program features a full planetarium display, automatic parallax correction, planet faces and solar system display in parallel projection. Astronomer on its own costs £29.95.

"One of a kind...every requirement provided for...descriptions like superb, ultimate, excellent are hardly adequate" QL World

Professional Astrologer £59.95
With Astronomer £69.95
Super Astrologer (elementary) £24.95

DIGITAL C

NEW!

Digital C is both the best and the fastest C compiler available for the QL. Highly trans-portable: exceeds the Small C specification. The QDOS library gives the most complete degree of QL compatibility.

Digital C generates machine independent, compact, stand-alone, multitasking executable machine code. The supplied library manager and generator allows integration of C functions into library modules for later use. Ideal for a beginner, sufficiently sophisticated and advanced for a pro.

Digital C can be used with Quill: to get the very best out of it, use it with Editor (either version).

£39.95 Complete with manual

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Inside QDOS. The full 260 page ROM dis. Send your QL's serial no. and £29.95, quick.

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Hardware. Interfaces from £70, RAM expansions from £50, interface plus RAM from £110, 3.5" DSDD drive from £125. Write for details.

Digital Precision gratefully acknowledges the help given by Dr. Helmut Aigner & offspring: no better monitors of the sesquilar could be asked for.

BETTER BASIC V2.0 £24.95

Just that - a program that will improve all your programs. Analyses, corrects, and annotates Superbasic Programs. The program is totally user configurable and very easy to use.

"Excellent, a five star program" **Sinclair User**

SUPERFORTH V2.0 £39.95

The full multitasking, stand-alone, high speed Forth 83 system is supplied with an extremely powerful compiled Othello (which beat the 1983 World champion). Now with extended 100 page manual and full string handling. Fully compatible with 68000 code and QDOS.

ULTRAPRINT V2.0 £19.95

Soup up your Epson/Oki compatible printer. 22 different type sizes and styles, giving you control over all aspects of text and graphic output. Easy to use, fast, multitasking and fully compatible with Eye-Q. Supplied with manual written for idiots.

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Send us your working new/used microcartridges and we will send you brand new **blank** disks. One 5.25" for 2 cartridges, one 3.5" for 4. Minimum quantity 12 cartridges. A super deal!

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Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Technical Guide	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details

☆ SPECIALS ☆

GST Macro Assembler + Assembly Lang Book **£39**

512K Expanderam + QFlash ramdisk/toolkit **£99**

● ALL PRICES INCLUDE VAT AND UK MAINLAND DELIVERY - WE EXPORT WORLDWIDE ●

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QL SCENE

Battery back-up—now more power

Frequency Precision has announced upgrades on two of its products. The FP Battery Backup, reviewed in *Sinclair QL World*, October, 1987, which protects the computer from mains interference and failure is available in an alternative form which provides DC and 15V AC during mains failures.

A QL equipped with the enhanced version, Frequency Precision claims, will retain all its characteristics. The facility allows the QL to use a battery-powered television set with a separate battery supply as a display, making a portable, battery-powered QL a practical possibility. The Backup can be charged from the QL Power supply and will provide one hour of operation when fully-charged.

The Back-up can also be provided with leads to allow it to draw power from a 12V car battery for over-extended periods.

Both versions of the Backup are provided with a re-set button which can be used to interrupt the AC supply to the QL at any time to suppress a previous printer instruction. Without the printer re-set function an incorrect printer instruction can be over-ridden only by a full system reset.

The enhanced Battery Backup costs £89 inclusive from Frequency Precision Ltd, Hillsview, Aller Road, Dolton, Winkliegh, Devon EX19 8QP. Tel: 0805 4381.

Three dimensions and trading accounts from PDQL

PDQL is releasing two new software packages, a 3D design program and a cash-handling package from Chas Dillon.

Image D, a three-dimensional design drawing program written by the Denchfield brothers, costs £24 and is supplied with examples. The program allows you to create logos, goblets, lampshades and many other shapes according to PDQL; view them in different perspectives, up to four screens at a time; change the viewing angle; merge designs; shade or line drawings; and print to file or printers.

Trading Accounts is a flexible accounts program along the lines of *Cash Trader* but optimised for business use. Existing Cash Trader data can be converted and the upgrade can be obtained for the difference in price of the two packages. Trading Accounts has a built-in analyser and can be used to produce asymmetrical groups — for example, 50 credit account and 10 capital account heads. Navigation is by initial letter or scrolling.

The program has a number of new features, including default prices for goods sold. It can produce a profit and loss account, balance sheet, trial balance and VAT report or return at any time. The program requires a minimum of 256K of memory and costs £125, with discounts to existing users and an extra £5 discount to support scheme members.

For more information contact PDQL, Unit 1, Heaton House, Camden Street, Birmingham B1 3BZ.

Alpha-base file handling from Germany

Alpha-Base, a new file-handling system for mass data, is released by German company Mueller EDV Beratung.

Some of the facilities announced for the package are up to 3,000 million records in one file with up to 32,767 characters per record and up to 255 characters per field; screen-designed screen input masks with 99 masks per file; supports *Editor*-like printer-data files; converts archive exp-files and converts to Archive and Quill _exp format automatically; includes a driver to main-merge Editor files and Quill _lis files; supports one primary key from up to three fields up to 500 characters compressed to an eight-byte format; very fast binary search of records in index files; all index-files handled on disc; modified Quick-sort algorithm; time-consuming file processes such as sorting carried-out by independent tasks; automatic re-organisation.

The QL version of the program is coded with the Digital Precision Turbo 1.14 and will cost £49.90. MEB is inviting dealer enquiries. For further information contact MEB, at Neuhausenstr, 42, 7270 Nagold 4, West Germany.

This is cricket — and no agruments

Bowled Over from Main Games is a new limited-overs cricket simulation game for the QL. The player can play either against the computer or a human opponent through 40, 45, 50, 55 or 60-over one-innings matches. A text commentary and fully-updated scorecards are provided. Version one of the program allows the scorecards to be output to an Epson-compatible printer on SERI at 9,600 baud.

The program has a database of about 160 county players which you can inport into the game. Aggression and pitch controls provide strategy. There are no arguments between players and umpires.

Bowled Over costs £10 inclusive from Main Games, 48 Ledgers Road, Slough, Berkshire SL1 2RL on two Microdrives or a single 3.5in disc.

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SPEEDSCREEN speeds up text and user-defined graphics output by up to 12.6 times. Window cleaning and cursor operations are much quicker and scrolling can be 8.2 times faster. As QL WORLD reviewer Mike Lloyd put it last month:

"The speed increase is phenomenal . . . SPEEDSCREEN does everything Creative CodeWorks claims . . . the package is well thought-out, thoroughly tested, easy to use and sensibly priced.
"It has the advantage of enhancing almost every piece of software available, and does so without imposing restrictions and without requiring any computer literacy from the user . . . SPEEDSCREEN will be very popular indeed."

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QL SPEEDSCREEN costs £20 on disk or tape (please state) inc. first class or airmail postage anywhere. PAYMENT MUST BE IN STERLING: UK P.O.'s, Eurocheques, Bank Drafts or cheques drawn on a UK bank. 7 day service.

SPEEDSCREEN is also available NOW, in ROM form only, for users of the CST THOR, price £30. A QL ROM cartridge version will be launched on 27/1/88, priced £30. All versions come with a full manual, new character sets, a design utility and toolkit commands.

The next program from Creative CodeWorks is **QUICKFAX** — a 'card-file' database that is easy to use and very fast.
QUICKFAX is being developed and tested now.
It will cost £20.
To find out more please send us an S.A.E.

OPEN CHANNEL

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

Editor's notebook

THIS month sees the return of Technical Helpline with a new contributor, Paul Walton. Welcome, Paul. Few people can boast the close relationship with a magazine that Colin Opie had with QL World and QL User before it, but we wish Colin all the best in his new career, and Paul a mutually rewarding run with QLW.

We also have Marcus Jeffrey's return in force, wielding his AI Draughts in one hand and a new expert shell program from Compware in the other, and Digital Precision's *The Editor*, now grown up into a full-blown word processor.

Where is all the games software? No negative answers, please. Send us the games, and we will last the reviewers into action! Remember we have an eight-week publishing lead time, so we need software at least four weeks before that. We are looking at ways to keep up to date with the oldies but goodies, too.

Drop into the Microfair and visit our stand ... I shall be on holiday as it happens. Oh dear, some evils you just can't avoid. Have a good time anyway.

In business

We are a manufacturing company which owns 12 QLs. They are used for costing, job control, accounts, word processing —Quill, management graphics —Easel, machine tool programming for mills and punch press. One is bolted into the control cabinet of a Beaver NC5 milling machine and replaces the original optic tape reader.

We have been operating QLs for three years, eight to 10 hours a day, five or six days a week. Screen lock-up problems in the early days were caused by operating system software which could be corrected by software. The worst problem was that any attempt to slice and print from a string array caused half a K of memory loss.

The cure was to assign a temporary string to the slice and then print the temporary string. Many QL returns could be traced to this problem. Since our QLs work in a dirty mains environment we can assure other users that there is no need for mains filters and other clean-up devices or fans for cooling, all of which we tried before finding the memory loss bugs.

Since we run more than 400 Microdrive cartridges we can also say that apart from the odd tape joint jam there are no problems with Microdrives and using the QL re-set button with cartridges in the drives does not cause tape corruption. Memory loss bugs can cause tape problems if the QL crashes with the drives running.

To test for memory loss, the following expression can be built into a program:

```
FREE MEMORY = PEEK—
L
(163840+16—PEEK—L
(163840+12)
```

The QL is particularly suited to machine control as the Microdrives can operate in iron-dust-laden conditions which are fatal to disc drives. The two RS232 ports allow transmission from QL to QL and from QL to machine tool.

There is also a price advantage, since commercial post processors for machine tools cost £20,000 and a QL system with more advanced features will cost £1,000, including 512K QL and colour monitor hardware.

Your article on ROM packs in the December *QL World* was of interest as we are trying to use this system for our software. The EPROM blower you describe is very good and we are using *QLiberator* to produce the code.

A. D. Middleton,
Claydate Ltd,
Norwich, NR8 6AP.

Mountain moves

Does anybody know to where Pyramide has moved?

As one of the estimated 9,000 QL users in France — would also be grateful to know of any useful QL *QL World*, October 1986 — I addresses in Paris or in France.

A. Swan,
Cergy, France.

Editor's comment: Pyramide's programs are now handled by Transform Ltd, 24 West Oak, Beckenham, Kent BR3 2EZ.

Not Ultrasoft

The QL Scene article about Ultrasoft in *QL World*, November 1987, is not up-to-date. From July, 1987 Martin Berndt nor Ultrasoft has been authorised to market my programs, *QWriter, QWriter II, Full House, Double Ion and Ion Gold*. All the programs, and *Arcanoid*, are distributed by myself. The same applies to Graphics Construction Kit, which is sold by QL Specials.

As Ultrasoft has no permission to copy or sell any of the programs, please print the up-to-date situation.

Jochen Merz,
Duisburg
W. Germany.

Drafts excluded?

What have you done to Marcus Jeffreys? I am sure I was not the only reader to flip eagerly through the December issue to find the promised continuation of his excellent article on artificial intelligence draughts missing. Please will your great magazine rectify this error and let Jeffreys finish?

Robert Berry,
Redditch.

Editor's comment: After what could be described as a prolonged Christmas break, AI Draughts is back on page XX, and will be continued.

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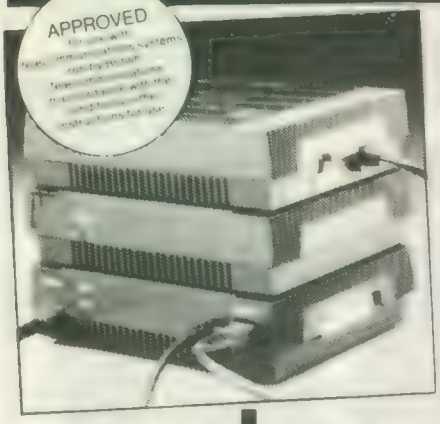

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- **Sector Software —** 39 Wray Crescent, Ulnes, Walton, Leyland, Lancs. PR5 3NA. Tel: 0772 454328
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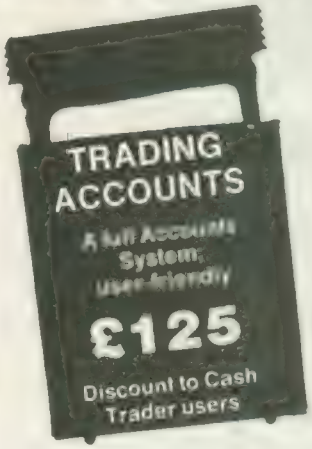

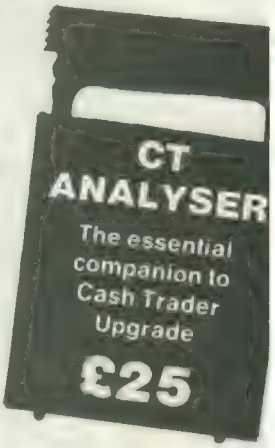

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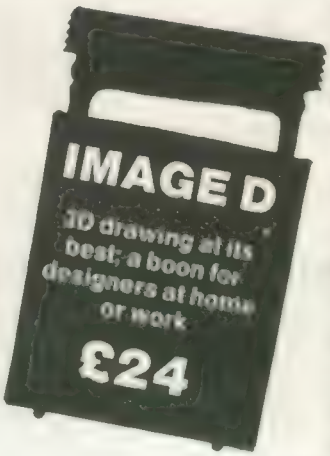

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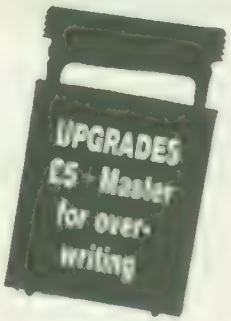

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UPGRADES: The following programs have been UPGRADED on the dates shown; users may UPGRADE their exisiting versions; send master + £5 - SEDIT (Jan 88); RECOVER PDQ-XREF and COMPARE (July 87); MAILMERGE de LUXE (Dec 87).

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TROUBLE

APROBL

Henrik Olsson wrote from Sweden to comment on my note in the September *QL World* about the varying values given for the sizes of certain files. There was an error in the printed article, in that the size given by Taskmaster for the Turbo_tk_code file was stated to be 6,162 whereas what appears on the screen is 6K 162 bytes, which I would interpret as 6,306 bytes, but the "6K" in indicates, 6,000 bytes and the total is 6,162 bytes.

As Henrik points out, this is 64 bytes more than the value given by Ice, the reason being that Ice quotes the basic file size — the space it takes in memory — whereas Taskmaster includes the 64 bytes space taken by the file header on disc or cartridge. Files are written in blocks of 512 bytes and even one byte of information effectively takes 512 bytes on disc or cartridge and it is probably sensible to reserve procedure space in 512-byte blocks, because that is what will be taken anyway by any lesser amount of information — the nominal 6,098 bytes file size will take 6,144 of memory.

The editor points out that another reason for reserving more procedure space than appears to be needed is to allow for subsequent corrections and additions to files, without the need to alter the boot routines that call them.

Chuck out Quill?

The new word processing program — *text*[87] — from *Software*[87], looks very interesting. In some ways, it has a screen presentation similar to the *Editor* program and both programs operate appreciably faster than Quill. A feature of text[87] which will attract users who need a variety of text types is the ability to display different fonts on the screen, with the space taken on the screen corresponding to the character sizes. If the font appearing has characters twice as wide as the those of previous text, the number of characters printed to the screen on each line will be halved. Selection of different fonts is by simple keypresses, once they have been loaded when the program is run. White, green and red text is selectable, increasing the number of text types representable by a factor of three.

Three roman and three sans serif fonts are available in a separate program called *Founted*. From the brief demonstration I saw, the characters in some of the fonts are much more acceptable than the rather unreal ones offered with some programs. The number of fonts which can be loaded for use is limited effectively only by available memory.

At present, the screen characters cannot be printed by a printer but this feature may be provided later; 255 translations are possible in the printer driver. If you care to make the effort in installing a font to represent each text type you want, there will be no need to use special characters on the screen to indicate where particular typefaces are to be called during printing.

Copy operations appear to be fast and use block markers. A word count is always available. The familiar Quill commands mostly are provided, together with several others. The program size is almost the same as Quill — 52K B — but the space taken by a given document should be less. The possibility of multiple documents with one copy of the program is being worked on; this feature would allow sections of one document to be copied into another.

All-in-all a very interesting new product but, as with all such developments, one must have some reservations about the availability and usability of some of the features mentioned by the supplier; the initial release of the program will not have a few of these feature but a production version is planned. The initial price of text[87] is £40 and that of Founted is £10.

Power problems

For those users still suffering from over-heating QLs, or from interference-induced lock-ups, **Adman Services** is offering a power supply to replace the Sinclair one. Priced at £15 plus post and packing, the supply looks better-made than the Sinclair one and is designed to reduce the heat dissipated in the QL by reducing the DC voltagle supplied to it.

The chips in the QL require 5V DC and this is obtained from a regulator, which receives a considerably higher voltage from the Sinclair supply; the surplus voltage effectively ends up as heat. The new supply gives the 5V regulator less work to do and this should make the QL and installed interfaces run cooler; a round check showed the temperature on the QL casing above the heatsink to be about 4°C lower. It is hoped this should also reduce the susceptibility to voltage spikes from outside the QL which causes it to lock-up. An AC output is provided for the port.

Odd points

If you use Toolkit II and are irritated by the garbage which sometimes appears when the last line typed is recalled, the advice I was given is to press Enter again before recalling the line but I have not found this cures the problem. Any other ideas? When multi-tasking Run-time Archive with other programs, it is possible to omit the RTEME% = 6*1024 command — which is in the Archrtm boot — but if you find nothing happens when the program is called, play safe and put the command back in.

The User Guide instruction on naming network stations says that it is necessary to give each station a different number but only if there are more than two computers in the network; with two QLs in use, naming both as NET 1 may avoid the occasional unexplained refusal to perform commanded operations.

Despite advice to the contrary, the PRT_USE command used with a network has so far failed to allow me to print to a remote printer. The command has no obvious effect. Has anyone succeeded with it? Taskmaster has been modified to allow the Re-set routine to work when a Trump Card interface is fitted to the QL; as yet I have not found anybody with suggestions on how to get Warm Re-set routines to work properly when this interface is in use.

Practical experience has confirmed what seemed likely regarding the noise coming from Mitsubishi one-third-height disc drives when used

SHOOTER

EMSOLVED

with the Trump. If the disc driver chip is changed from the standard WD1772 to a WD1770 as used on many eariler interfaces, the noise returns to the normal level. The WD1770 should work correctly with NEC drives also. A sure sign of the success of the Trump must be the appearance of this card at user group meetings; if it also takes over from the Medic board at Microfairs, it would seem safe to say that Miracle has had a hardware success.

Responses

Jacob Lewin wrote from Paris, to say that his 2.30 version of Quill does not work properly with Taskmaster. Specifically, calling the Tab routine appears to produce the Import routine instead. I have checked this with both 2.30 and 2.35 Quill and find no problem with either in my system. Sector Software has no knowledge of such a problem. The likely fault would seem to be corruption in either the Quill or Taskmaster files on Lewin's system, although we would expect this to give other problems as well.

Smiling Software reports having sent a copy of *The Complete Toolkit VB* to **K. R. A. Gentle.** The order had apparently been overlooked previously, Complaints about non-delivery of orders have been received from **Christine Laurent** in Belgium, **Alasdair Walker** in Scotland, and **Elizabeth James.** The backlog of orders from the summer was said to have been almost cleared.

The outstanding orders are for mouse packages and shortage of mice is causing the delay. Considering how simple and cheap the construction of mice is, it is surprising the problems QL suppliers experience with them. Do U.K. manufacturers think it worthwhile producing a standard mouse for the QL? Note the new address for Smiling Software.

R. A. Selby and **R. G. Wells** have had difficultly contacting **D. S. Enterprises.** I can only add that I have had the same difficultly. How about some response, DS?

For a change, a letter has been received complimenting a supplier. **Godwin and Cowper** wrote from Stourport to say how well they had been treated by **PDQL;** apart from being supplied with information by telephone, it received a demonstration of hardware and software in its offices.

Transform International is one supplier which feels the QL market is worth staying in and the company is expanding its QL-related activities. A circular has been sent to customers of **Eidersoft Ltd** to advise them that the Eidersoft range of QL activities is now being handled by Transform International; in addition, the *Pyramide* range of software also is now being sold by TI. Various magazine services are operated by TI and it assures me that queries from **K. R. A. Gentle** about missing sections of programs supplied by Microdrive Exchange are being dealth with — the necessary section of *Roulette* was put into the November issue.

A. Torrance of the RAF wrote making comments which will be echoed by many QL users. He has not received good ordered from two firms. In the first case, **WD Software** has apparently not supplied the item ordered despite six letters being sent. It did not, however, cash the cheque sent for the goods. **Empire Software** could not supply an advertised product and, rather than return the money sent for it, sent a refund voucher. Three months and three requests later Torrance had still not had his money returned. The items concerned cost about £15-£20 and it is probably correct to say most people do not find it worth the trouble to chase after things which cost relatively small amounts and that suppliers are well aware of that. While it involves some trouble, it may be worthwhile taking such matters to the Small Claims or similar court and asking for costs as well as the sum paid for any goods which were not supplied. The court can ask for a suitable amount to be paid into court if the defendant concerned is not prepared to appear to defend the action and the plaintiff can get back money after a relatively brief appearance in court.

There have been two reports of **Persoft** failing to supply the program *QDam in 3D.* No response has been received to attempts to chase one of the orders.

A compliments slip from **4 Systems** has been sent to me; for readers who are still attempting to get back money from this one-time QL supplier, the details are given below.

Henrik Olsson says that QL suppliers must have a bad name in Sweden, judging by the experiences of himself and a friend, both of whom paid for goods which have not arrived. He thinks he was cheated on one occasion over VAT which he feels was not returned to him. That is always a problem area, because the process of recovering VAT charged on orders sent overseas is not the simplest of things with which to deal, and it varies from country to country.

Buyers in the EEC can claim back VAT in their own countries, whereas those outside the EEC have to reclaim it in the U.K. Some buyers may be under the impression that a supplier can leave the VAT off the invoice but it is not so straightforward. As shipping goods overseas tends to be more expensive than shipping them in the U.K., some suppliers quote the same price for home and overseas without mentioning VAT and effectively incorporate the VAT amount into the shipping charge on overseas orders. This may appear to be cheating but it is only a way of trying to keep the total cost of despatching goods the same for both home and overseas.

Information

Smiling Software, 8 Croxton Close, Rose Hill, Marple, Stockport SK6 7RQ.

Software87, 33 Savernake Road, London NW3 2JU.

4 Systems, Proprietor L. H. Hadid, 68 Foxwood Close, Feltham, Middlesex TW13 7DL. Tel: 01-844 1399. Telex: 265871: ref. NTG 018. Telcom Gold 83 NTG 018. Micronet Mailbox 018441399. VAT Reg No 409-7612-42.

Adman Services, 53 Gilpin Road, Adamston, Telford, Shropshire. TF5 0BG. Tel: 0952 55895.

Title: *QL Expert*
Price: £49.95
Supplier: Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA. Tel: 0270 582301.

Out of the Shell

Marcus Jeffrey examines the first Expert System package for the QL. His verdict: it may be primitive compared to a mainframe, but it knows its heroes from its dragons.

Compware have recently announced the first Expert System Shell to be made available for the QL. Though very basic systems have been available on other home computers, this is the first time a realistic system has been available on anything cheaper than an IBM PC.

An expert system is a computer system incorporating some form of expertise about a given situation. The expertise usually is held in the form of a database, where the data consists of the knowledge about the chosen subject and rules connecting the knowledge. The term knowledge engineering has been coined as the method by which expertise is placed into the expert system database, from which the knowledge can be dispensed to others, just as the original expert would.

One more important aspect of an expert system is its ability to explain and justify its solutions to convince the user that its reasoning is correct. Thus an expert system consists of a number of facts — they may be implicit or entered by the user — and a number of rules. A small example system may contain the rules:

1 If you own a QL you are a hero.
2 If you have disc drives you are a hero.
3 If you are a hero you can slay lizards.
4 If you can slay lizards you will be hounded by the RSPCA.
5 If you own a QL and own disc drives you are a mega-hero.
6 If you are a mega-hero you can slay dragons.
7 If you can slay dragons you will get the princess.

These are known as production rules, where the text following the IF describes a condition and, if the condition is true, a result follows which may fire further rules. The aim in this example is to get the princess. Reading through the rules you will see that the only way this can be achieved is if the fact base states that you own a QL and disc drives.

At present, all our rules contain true/false results but as we all know the world can rarely be seen in black and white but contains many shades of grey. Consequently an expert system will allow us to include probabilities — the jargon for this is "fuzzy logic." We might change the foregoing system to include rules of the form:

1 If you own a QL there is a 90 percent chance that you are a mega-hero and so on.

An important aspect of an expert system is its ability to explain its reasoning. In the foregoing example, when trying to build the fact base, the system may ask:

DO YOU OWN A QL?

To which you could answer "WHY" and the system could then tell you that it is trying to determine whether or not you are a hero/mega-hero. Further enquiries indicate why that is important to subsequent rules and so on. Eventually you will have been told that the system is trying to determine whether or not you get the princess — assuming that is your goal. Further questioning at this level will give the response "Because you requested it."

Now to *QL Expert*. It is an expert system shell, containing everything necessary to create and interrogate expert system databases of your own. QL Expert differs from its PC counterparts only in its application and approach to entering rules.

Prompts

Unlike the production rules shown, QL Expert numbered rules are in the form of goals, followed by details containing the structure of the rule base. They may consist of one or more sub-goals which must be evaluated first using other rules. If there is no rule for one of the sub-goals, QL Expert prompts for user input to assign a value the sub-goal. If we had rules for "get princess" (goal) if "slay dragons" (sub-goal) and "slay dragons" (sub-goal) if "mega-hero" (further sub-goal), but no rule for determining whether or not you are a mega-hero, QL Expert would ask you. When asked whether or not you consider yourself a mega-hero, you are expected to tell the truth.

In that way, rule bases are built backwards, working from goals, then explaining how they can be achieved as a series of sub-goals, then how each of the sub-goals can be achieved and so on. Eventually you will reach a stage where sub-goals are defined by user input — owning QLs and disc drives in our example.

QL Expert works by performing a linear search through the rule base. It is very different from most other systems which tend to hold a hierarchy of rules in a tree-like form. Consequently QL Expert will be slow on large rule bases. The extent to which this will be a problem will depend on the market at which the product is aimed. When questioned, Compware stated that it expected QL Expert to sell mainly to hobbyists and people interested in learning about expert systems rather than designers of large expert systems applications. If that is the case, speed will not be such a critical factor.

All the basic necessary commands for editing, saving, loading and printing expert systems are included. The rules may contain a variety of commands, including Boolean and fuzzy logic, input and output statements,

```
--> How green is subject's skin - 0 to 1 (1=very green) 0.9
--> Does the subject have bog eyes (yes or no) YES
--> over 150 years old ? NO
--> xray vision ? NO
--> dislike kryptonite ? NO
--> drink abbot ale ? YES
--> own ql ? YES
Results:
   The likelihood that the subject is alien is 67.5%.
   The likelihood that the subject is human is 95%.
```

▲ **Above: a sample interrogation of the sample rule base illustrated below. (Readers may, of course, disagree with the conclusions).**

conditions and so on. Goals may be controlled by MIN OF, MAX OF, FIRST OF and ALL OF constructs. They are used where probabilities are included. So, for instance, with a medical database the most likely illness could be given with MAX OF probabilities, the range of possible illnesses — and the likelihood — could be given with ALL OF, and so on.

QL Expert is supplied on a single Microdrive cartridge with an INSTALL program to change default devices, memory requirements, recursion levels and so on. In addition to the program — Turbo-compiled SuperBasic — three small example rule bases are included. The program occupies most of memory, leaving less than 10K available for the rule base on an unexpanded QL. Compware reckons this allows room for systems contaianing up to 100 rules, though that depends on the rule size and length of goal strings.

No index

The 60-page, A4 ring-bound manual is very comprehensive, lacking most notably an index; we understand this will be rectified. The manual has been designed with the beginner in mind, explaining expert systems and their uses, then explaining how rules are built, before launching into the editor facilities and more advanced rule options.

It is rather surprising for a system of this type that there is no facility to produce run-time modules. Page 58 of the manual specifies that you must obtain a run-time licence from Compware before distributing copies. That is understandable when you consider that the entire program, including editing facilities, must also be transferred. We understand that the latest version includes a run-time module, in which case the restriction may be lifted. The new version of QL Expert also includes a number of additional commands, designed to improve reporting to the screen.

As a professional product designed to produce commercially-acceptable expert systems, QL Expert contains everything necessary, though on a very primitive level but, as the first expert system shell available for the QL, and as an introduction to expert systems, it performs more than adequately.

Below: a sample rule base from QL Expert, built up by interaction between the user and the software. ▼

```
RULE# 100
      DEFINE origin
      LABEL Human/alien species determination
      ALL OF alien,human
RULE# 110
      OUTPUT origin
      PRINT Results:
      PRINT    The likelihood that the subject is @
      is %%.
RULE# 120
      DEFINE alien
      FACTOR 0.75
      green skin
      bog eyes
      OR
      over 150 years old
      alive
RULE# 130
      DEFINE alien
      FACTOR 0.9
      xray vision
      OR
      dislike kryptonite
RULE# 140
      DEFINE human
      FACTOR 0.95
      drink abbot ale
      own ql
RULE# 150
      INPUT green skin
      PROMPT How green is subject's skin - 0 to 1 (1=
      very green)
      OPTIONS <=1,>=0
RULE# 160
      INPUT bog eyes
      PROMPT Does the subject have bog eyes (yes or no
      OPTIONS &
```

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SUPER BASIC

Mike Lloyd explores stacks and queues and discovers a maze-searching algorithm

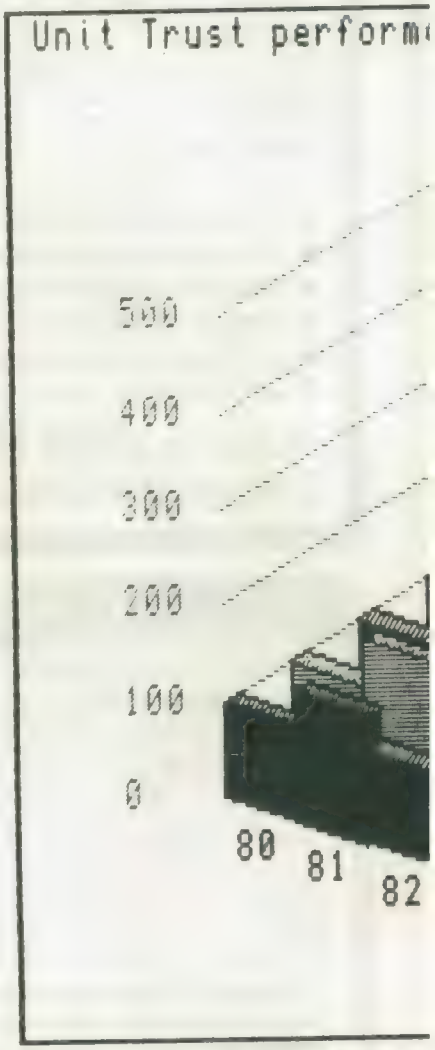
SuperBasic this month sets the scene for a major programming project which will unfold in the next three months. The aims are to demonstrate the application of planning techniques, to give an insight into three very different areas of practical programming and ultimately to provide a useful and original program. The program is a valuable addition to the Psion suite which provides the three-dimensional block graphs shown in the accompanying screen dumps — Figures 1 and 2.

Computer pundits write frequently about programming techniques using examples of programs which seem to have been planned and executed flawlessly. They rarely reveal the false starts, the faulty logic and the hours of harassed searching for the last remaining bug, thereby giving an artificial impression that good planning is invariably successful.

Readers therefore gain little insight into the trials and tribulations of producing a functioning, error-free and reliable program. By keeping notes of some programs as they developed in the last few months I have been able to select one which is suitable for use as an example and to relate exactly how it was written in the hope that the practical experience, including the mistakes, will be of more value than an exposition of how it should have been done.

The start of the story for any program must be the original need which led to its being written. The 3D graph program emerged because the graphs produced by Psion Easel are rarely much better than could be achieved with graph paper, coloured pens and a stencil set. Easel graphs tend to become cluttered, different data sets are not easily distinguishable — especially when dumped to a printer — and the space available for annotation is very limited. Other disadvantages, and the reasons behind them, could fill the rest of this article but the temptation to list them has been resisted.

The conventional answers to such problems with hand-drawn graphs are to choose bigger pieces of graph paper and use a wider selection of coloured pens. Neither of those solutions is applicable to a QL. The clue to improving on limited Easel performance was provided by the work of graphic departments in TV news studios.



Complicated sets of data are presented on television most frequently using three-dimensional block graphs. It is interesting that the blocks occupy less screen space than their two-dimensional counterparts but they are clearer to read, impart more information and, most important, look good, therefore justifying the use of a computer to produce them.

The first step in writing the 3D graph program, as for any programming project, was to undertake a compre-

hensive feasibility study. Through experience I have developed an instinct for those projects which, despite initial promise, are doomed to eventual failure and therefore should never be started. The main objective of a feasibility study is to assist instinct by discovering as many limitations as possible which might be imposed by equipment, users, data, circumstances and the programmer's programming ability. When the limitations overwhelm the original idea or when two steadfastly incompatible limitations cannot be resolved, stop.

For the project in hand, the QL has more than sufficient memory capacity to store the relatively small amounts of data which would be graphed. Its screen is pixel-addressable and therefore allows multi-coloured, irregular shapes to be drawn. The QL also has suitably-powerful file-handling facilities and it has a screen dump as part of the Easel package. SuperBasic is well-blessed with a strong suite of graphics-handling commands. In short, the specifications of the hardware and firmware were unlikely to impose any serious limitations on the program.

The imagined user was someone familiar with the Psion suite but not necessarily with SuperBasic. Similarity to Easel, if not outright compatibility, was therefore important. The program would also have to think for itself as much as possible to produce a workmanlike result. Some intended users might link their QLs to TVs rather than monitors and so the program was limited to using only the TV display area of the screen.

The main disadvantage with the programmer was that he knew next to nothing about mathematics. As he is married to a mathematician susceptible to bribes of chocolate, that was not considered to be a fatal disadvantage.

The major programming problems to be solved were how to obtain the input, how to create the display and how to produce a hard copy of the output. The answers to the first and third problems were suggested by the similarity of the program to Easel. Data would be imported from Easel, Abacus or Archive and the Psion screen dump routine *gprint—prt* would be borrowed to produce hard copies from dot matrix printers. Once the basic of the graphics calculations was worked out, the program as a whole could be declared feasible.

The problem of program control was left for later consideration, as it was assumed that some kind of system would be easy to arrange. An unquenchable faith in the ingenuity of human nature has its place in the world of computing.

There are two ways of producing the illusion of three dimensions on a flat surface such as a VDU screen. The first, called true perspective, involves making lines which are parallel look as if they will eventually converge. It requires a thorough understanding of an area of mathematics which had somehow passed me by and was therefore discounted.

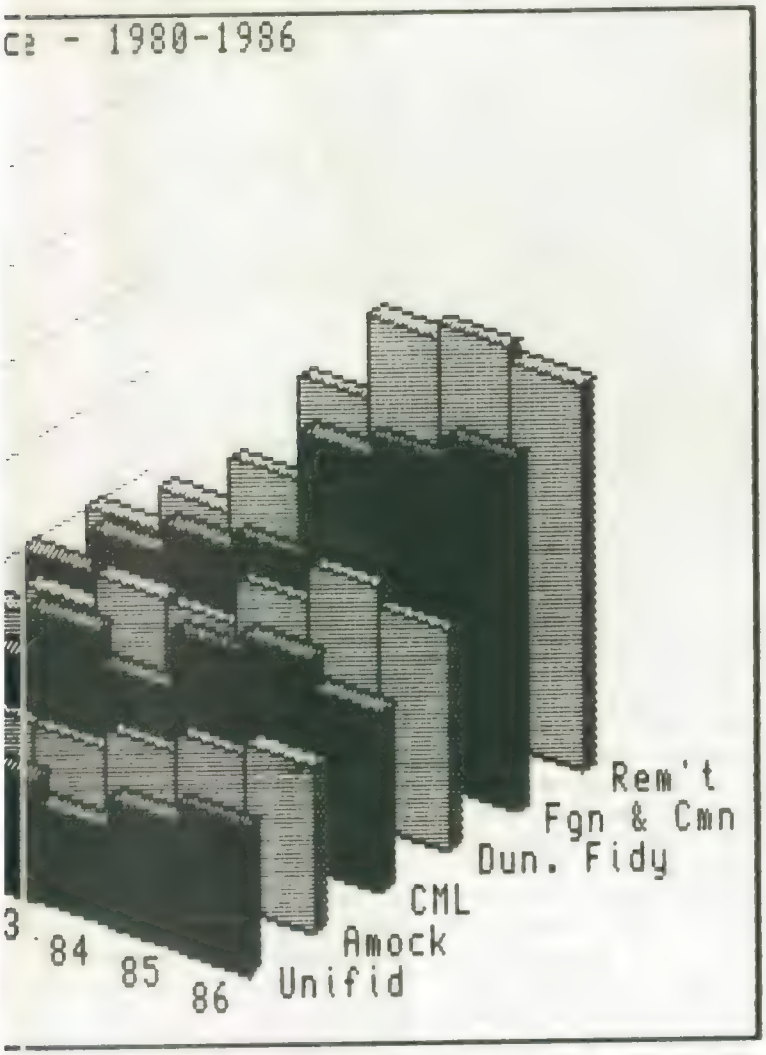
The second method is called "false perspective" and it relies on the remarkable ability of the brain to tell itself lies. In false perspective, all parallel lines remain parallel but because the eye compensates for the consequent ambiguities the brain is content to "see" a solid shape where there is really only a flat surface.

False perspective works best with simple, regular, straight-edged shapes and is enhanced by the use of other depth cues; 3D graphs fit this description and the QL can enhance the impression of solidity by using a stipple to suggest shading. The main advantage of false perspective, however, is the relative simplicity of the mathematics involved.

The feasibility study concentrated on how to produce a single 3D block on the screen under the misapprehension that this process need only be repeated with revised co-ordinates for the other blocks to be displayed. Unfortunately, the trial ignored the problem of calculating the offsets between blocks and led to some unworkable methods being explored before the algorithm which was eventually chosen was found.

No decision was taken about the SCALE associated with the display window. The calculations for the height of the blocks were no different from those needed in a simple two-dimensional histogram and the use of false perspective meant that the top and bottom edges of each block remained parallel.

The "viewing angle" was another matter. Simple co-ordinate offsets in LINE commands could cope with an individual block but it then



became exceedingly difficult to plot the co-ordinates of other blocks so that they were adjacent to and appeared to be parallel to their neighbours. The problem was reduced to calculating a "reference point" for each block relative to which the sides of the block could be drawn.

The only way of calculating the location of each reference point was by trigonometry and following the payment of a consultancy fee of a few chocolates, the necessary secrets were divulged. It was only later that it was realised that trigonometry offered other valuable benefits to enhance the screen displays.

The feasibility study completed successfully, program planning could begin in earnest. Having described in an earlier article the benefits of the top-down programming strategy it may be surprising that it is not a method I adopt usually. The approach I use instinctively is similar to "object-orientated design", a relatively new planning strategy which has become associated with the Ada programming language.

The central concept in object-orientated design is the definition of an object. Objects can be data structures or single values or the product of some process. For the 3D graph program these might be identified as follows:

Data input
Data array
Block reference points
Solid block
Graph display
Hard copy

Objects are related to each other according to how they interact, as shown schematically in Ffigure 3. Contrast it with the top-down planning approach at Figure 4. Object-orientated design emphasises the *results* of processes rather than the processes. Conversely, top-down planning diagrams highlight the processes and leave the presentation of the results of the processes to dataflow diagrams. The two methods are complementary and although experts argue about which is superior, both strategies have their place in the programmer's repertoire.

The advantages of object-orientated design are first seen when large projects are undertaken from a specification written by a non-computer-literate person. The sponsor writes a narrative description of what the finished program should achieve, which for the 3D graph might read:

The user chooses a source for importing a data table into the program and then selects the viewing angle (and any other display options) before causing the block graph to be drawn on the screen. The block graph comprises a series of vertically-scaled blocks arranged in a grid conforming to the data table. The user can then request a screendump to a printer or return to the menu.

The objects of the program can be determined by extracting the nouns from the narrative. The operations associated with each object can be identified by noting the verbs and adverbs in the description. The result of this analysis might look like:

source	select
data table	import
viewing angle	select
display options	select
block graph	produce
vertically scaled blocks	produce
grid	arrange
screendump	select
menu	select

Where verbs are sufficiently similar they are represented by the same word, so that related processes are readily identified. The relationships between each of the objects are then defined. Finally, user-defined procedures are created to match each of the processes to produce the declared objects and the program is complete.

My variation of object-orientated design is to begin by identifying the core object of a program. In the present example it is a table of values representing the pixel co-ordinates of the top and bottom of each block in the graph. In other circumstances it might be an array of cheque transactions in a financial program or a list of rooms and objects in an adventure game.

Having identified the heart of a program, the rest of the code is devoted either to producing the core object or making use of it after it has been produced. The project is thereby divided neatly into two parts. The advantages are that fundamental design problems are encountered early in the programming stage and peripheral parts of the program do no affect unduly the construction of the core object merely because they were written first.

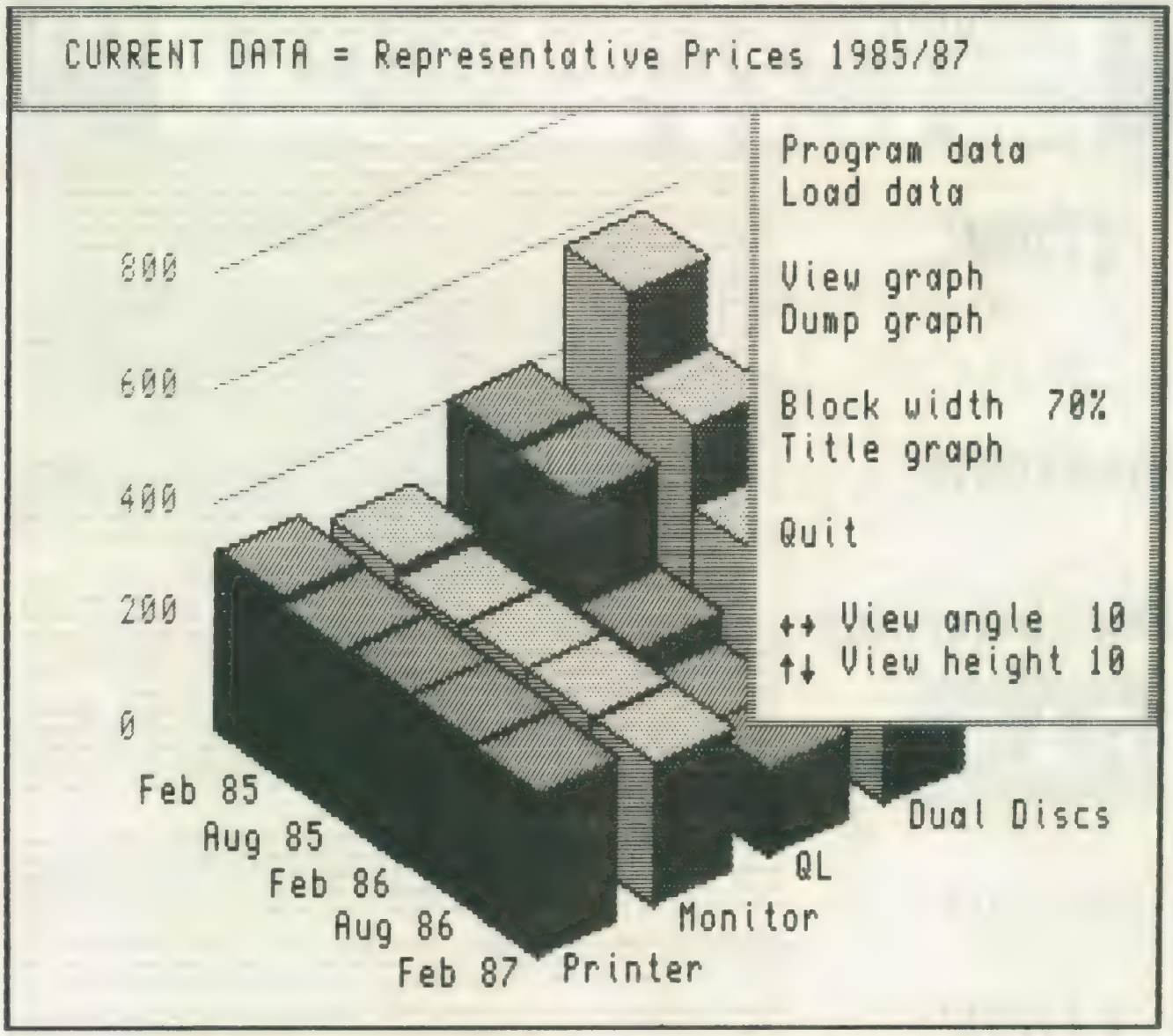
A future SuperBasic will reveal that in the example project this approach led to the program being completed with an unacceptable disadvantage and it needed to be re-written substantially at a very late stage. With a large commercial program this would have been disastrous. The experience emphasises that no planning strategy is foolproof.

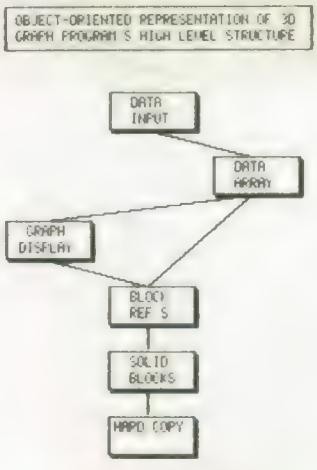
Whichever approach to planning is chosen, the stage is reached eventually when the overall structure of the program has been determined. The higher structure of the 3D graph program can be represented in pseudocode like this:

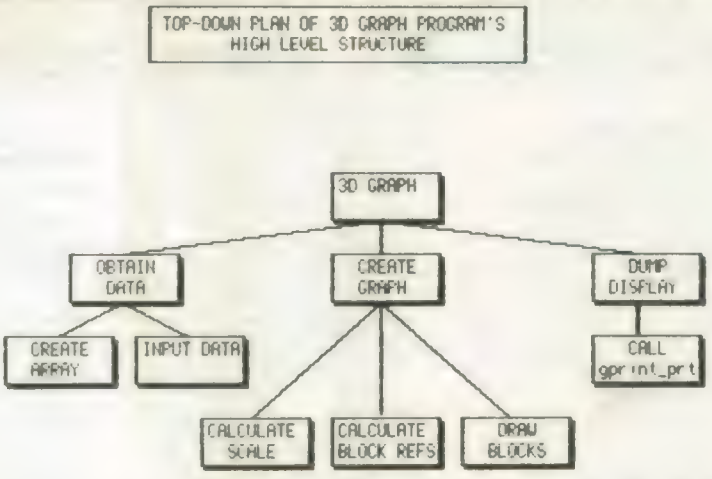
```
initialise
REPEAT
display menu
SELECT on options
  change viewing angle
  load data
  display graph
  dump graph
  quit: STOP
END SELECT
END REPEAT
```

Functionally, the program comprises four modules — data capture, screen display, screen dump and user control. As the Psion *gprint—prt* machine code program takes responsibility for the screen dumps, the SuperBasic program is left to cope with the remaining areas. Before planning and executing each of the modules the last part of the general planning stage was to ensure that the output of the data capture module would be compatible with the input expected by the screen display module.

The data tables being graphed are ideally-







suited to representation by a straightforward SuperBasic numeric array. It was assumed that whatever the source and structure of data it could be converted into a suitably-sized array but this later proved to be incorrect, leading to a re-write of the internal representation of program data described in two months' time.

The general planning stage produced a valuable framework on which the details of the program could be based. The framework became modified as the program developed but this is a common occurence as unforeseen problems inevitably are encountered and need to be overcome. It was in a large measure due to the existence of a clear, coherent and workable plan that the finished program was concise, met the design requirements in full, and was finished in two evenings.

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THE

Thor

RANGE

MONITORS

QDisc Interface

RAM plus

NEW INTROM I AND Thor SPEEDSCREEN

The Thor computer systems are professional business machines designed with the user and his futu requirements in mind. CST have developed several models with either single or double 3.5in, NEC flop or 20M SCSI hard disc and floppy, making the Thor extremely versatile. Thors are quipped with 640K RA parallel and serial printer ports, battery-backed clock and a separate IBM style keyboard. Supplied fr with all Thors is a customised version of the award-winning Psion Xchange software suite as well as I and T-dump. Special features of the Thor include multitasking at a single key stroke and enhanced scre windowing.

The Thor 20 system, using the high speed Motorola MC 68020 processor, delivers up to three times t computing power of the standard Thor. The Thor 20 package includes a suite of development softwa comprising a specially commissioned macro assembler by Talent Computer Systems and a linker by G In addition to the Psion Xchange business software together with full supporting documentation. The Th 21 system is designed for "number crunching" applications. Based on the 68020 and additiona incorporating the MC68881 floating point coprocessor, the performance of floating point operations a dramatically improved — taking only 1% of the time taken without the coprocessor. This system essential for a wide range of scientific and engineering applications and only costs an additional £201. (inc. VAT).

CST now offer a choice of monochrome or colour monitor suitable for use with the Thor range computers. The Philips CM8833 14" colour monitor includes interface lead and screen. The phili 7502 12" monitor has a dark anti-glare screen, horizontal/vertical size adjustment, position adju ment, brightness and contrast adjustment and a foldable foot. Both of these monitors have be selected by CST from the wide array of available monitors for their superior performance a reliability when used with the Thor computer range.

The best-selling floppy disk interface is fitted with a 16K EPROM containing many 'Toolk extensions, and CST's Ram Drive 2. It may be used with most 3.5 or 5.25 floppy disc drives. CST own twin slimline double sided 80 track 3.5 units being exceptional value for money, with 720K formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands an functions designed to improve access to the powerful facilities of the QL without the need fo machine-code programming. Job control is made easier, files can be used for random acces alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

The Ram Drive device driver allows free memory to be used as though it were a very high spe disc in fact the fastest such device when used with the RAM-plus. Ideally used for the storage temporary results, or multiple screen images for animated displays, it also eases the copying files in single disc systems. The Ram Drive can only use memory which is free, so the full adva tage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ra Drive is also available on 3.5in. and 5.25in. floppy disc.

The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grad 256K memory devices, this unit is the only one which offers the high performance of no waiting stat operation. In fact the CST RAM-plus is the fastest ram expansion according to independent tests carrie out by Digital Precision. Housed in a rugged metal case, the RAM-plus unit has an expansion slot whic duplicates the QL's, allowing any other CST peripheral to be used with it.

CST are distributing two rom upgrades for the whole Thor range: SPEEDSCREEN & INTROM I. Installatio costs a nominal £15 which covers return delivery, packing and insurance. Please insure your machin when you send it to us. Alternatively you can install the new roms yourself, instructions are included.

SPEEDSCREEN, using the new optimised code by Simon N. Goodwin, makes the Thor display up to twelv times faster. SPEEDSCREEN works with existing programs without alteration. Displays look just the sam but are drawn much quicker. SPEEDSCREEN is also available on 3.5" or 5.25" floppy or microdrive for th QL.

INTROM I integrates the Talent Screen Editor., QJump's Toolkit II and Digital Precision's Turbo Toolki SuperBASIC extensions and Buvex's Thor Dump screen dump into one package.

Please supply:-	UK inc VAT		Overseas	
Qdisc Interface 4 (3.5in. util disc)	£79.95	☐	£72.70	☐
Qdisc Interface 4 (5.25in. util. disc)	£79.95	☐	£72.80	☐
QEP-III Eprom programmer (QL/THOR)	£129.95	☐	£116.00	☐
RAM-plus 512K QL memory	£139.95	☐	£125.20	☐
CST Dual 3.5in. cased floppy discs	£219.95	☐	£200.40	☐
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CST QDISC SCSI interface	£230.00	☐	£203.40	☐
Qdisc 4 + dual 3.5in drives	£275.00	☐	£249.40	☐
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Thor User Guide	*£20.00	☐	*£23.00	☐
MC68020 User's Manual	*£20.00	☐	*£23.00	☐
MC68881 User's Manual	*£20.00	☐	*£23.00	☐
Talent 68020/68881 Assembler	*£34.50	☐	*£33.00	☐
*refundable on purchase of appropriate Thor				
For the Thor Range:				
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Philips Monitor (Colour)	£295.00	☐	£300.40	☐
Beige Mouse	£74.75	☐	£72.00	☐
Psion Chess	£24.95	☐	£22.70	☐
INTROM I from Interlogic	£49.45	☐	£44.00	☐
SPEEDSCREEN rom for Thor	£29.90	☐	£27.00	☐
ROM Installation on your Thor	£15.00	☐		
Floppy Discs 3.5", pack of 10	£15.00	☐	£14.00	☐
Additional 12m Service contract (1F&FF)	£85.25	☐		
Additional 12m Service contract (WF)	£115.00	☐		
QL Trade-in against Thor		☐		
Deduct £70 (UK) £60 (O/S)				
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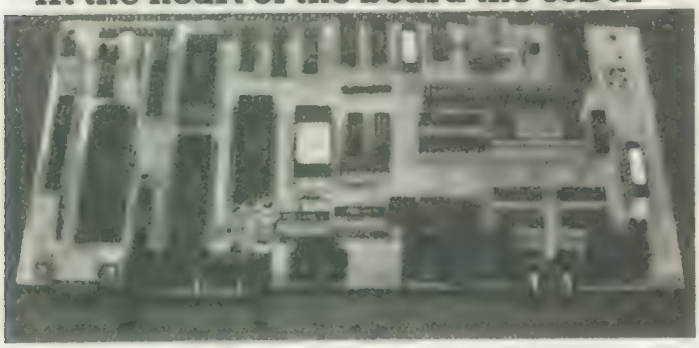
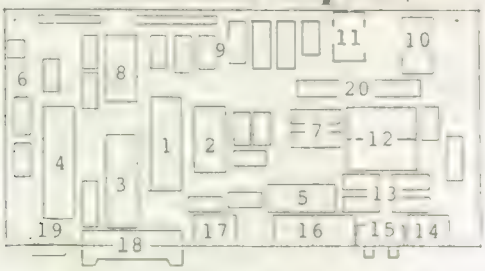
CST Thor TIMES CST

No 880208

At the heart of the board the 68B02



Schematic Layout



Main Components

1. 68B02 second processor; 2. Second processor firmware EPROM; 3. 68681 dual programmable serial interface; 4. 68230 24 bit parallel interface + timers; 5. 8K dual ported static RAM; 6. Digital to analog converter and Audio amplifier; 7. Data buffers; 8. Floppy disc controller; 9. SCSI interface PAL and 'glue' logic; 10. Real time clock; 11. Battery for clock; 12. User EPROM slots, 2 x 27512; 13. Multiplexers for dual ported RAM; 14. Video connector; 15. Network connectors; 16. Serial port connectors; 17. Keyboard connector; 18. Parallel printer port; 19. Mouse connector; 20. Inter board connector.

HARD DISC FOR QL

Using the tried and tested, high quality 20Mb Rodime drives already in the Thor range, CST have brought out an external hard disc unit for people wishing to upgrade their Thor or QL.

Upwardly Compatible

Plugged into the expansion port the unit is fully compatible with both machines and is supplied with interface, PSU and firmware in one compact box. Backing up is no problem as there is also a floppy disc interface (Schugart standard) with cable and socket.

Data transfer times are around 500Kb/sec on standard hardware although on Thor 20 and 21s a rate of 1Mb can be achieved. The unit costs £749.80, with built in single floppy £849.74 both prices inc VAT.

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INS AND OUTS OF THE THOR XVI I/O BOARD

Following on from last month's article which described the Thor XVI's main processor board, this month we introduce the XVI's novel I/O Board.

Described by CST's proprietor, David Oliver, as "the cure to the I/O bottleneck found in conventional personal computer systems," the new Thor's I/O board is claimed to have "as much power, in its own right, as a BBC micro."

The board has two types of function: interfacing with disc storage devices and the real time clock, and providing communications to the outside world via the mouse, serial, parallel, keyboard and network ports.

Floppy disc and optional SCSI interfaces are controlled directly by the main processor as the peak data transfer rate is high but intermittant and so causes only a low CPU overhead. The disc connectors are visible at the rear left of the photograph. Also directly accessed by the main processor is the battery backed real time clock (there is no CPU overhead in accessing this) and the "User" eprom slots which are 8 bit wide for ease of programming.

INTELLIGENCE

All other I/O functions are handled by the 2MHz 68B02 microprocessor: this receives commands and data via the duel ported ram, shared with the main processor, which only sees "perfect" devices, Qdos compatible queues and buffers.

It is the intelligence of the 68B02 that releases the main processor to get on with its own work. It also provides greater functionality: e.g. as well as a "BEEP" interface to the loadspeaker's driver, there is a queue allowing digitised sounds to be generated and then simply sent to the I/O Board.

PROTOCOLS

The "outside world" interfaces are seen from right to left at the front: the video output, network ports (an enhanced version of QNET), serial ports which support the proposed BS-5/8 (DIN connector) standard, split baud rates, x-on/x-off protocols etc, AT compatible keyboard connector, parallel port (BBC micro style) and a fully user-accessible mouse port.

Oliver claims that this is everything most users will ever want, "but there's always the QL compatible expansion slot for anything we've forgotten!"

Dear Hilde . . . THOR TIMES AGONY AUNT

As a dentist in an expanding partnership I've found my QL invaluable help in keeping up with who's pulled what and when. What I really need now is a professional system for the practice and perhaps an accounts package adapted for teeth. Can you help?

C. Pullman
Exmouth

Dear Mr Pullman

WYS (c/o CST) have got just the right set up! Their software uses networked Thors so your assistant can type them in as you are pulling them out as your receptionist generates the bill. Quite painless! But I still prefer a toothbrush.

Hilde

Next Month: Prize caption competition!

QL EDUCATION

QL EDUCATION

MONTH SIX: Practical Skills

Leslie Fahidy looks at algorithms for teaching non-academic skills, and the use of pseudo code.

It may have been assumed until now that we were dealing only with teaching academic skills to academic participants. That is not necessarily so. A student with a lesser academic ability is likely to benefit more from computer-aided teaching.

Now I investigate the less academic areas of teaching and discuss how the computer may be put to good use. I feel I should stress one general point we must not assume that the less academic student is less intelligent.

One of the prime examples for non-academic teaching material is the typing tutor, which must be available more or less for every computer, including the Sinclair QL. Some typing tutors I have seen for different computers do not really attempt to teach keyboard skills but give a student some controlled practice. Alternatively, by the use of graphics, it is possible to teach the subject as well, showing which finger should be used for the different keys.

Whether or not the typing tutor program undertakes teaching, it should give practice to the learner. It is best to split the task into several parts — separate sections for practising letters, numbers and punctuation marks. At the end, of course, those sections should be drawn together to provide more realistic practice using all the elements.

Since speed in words per minute is so important in typing, the program should clock the speed achieved after each line or two of practice. With the built-in clock in the QL it should not present any difficulty. Apart from speed, accuracy is of the greatest importance, particularly in the early stages of learning. A reasonable approach would be to accept a certain amount of inaccuracy, say two percent, as unavoidable.

While on the subject of keyboard skills, I must mention word processing. What I have in mind is not a program to teach the use of Quill, or any other word processor but to teach general points. All word processors have certain features in common — they can edit text, underline or bold face words, delete and insert text, move paragraphs, search, find and replace text.

I have been teaching the use of

many types of word processor on a number of computers for some time and I have often felt the need for a simple program which explains these aspects of the software and gives some practice in carrying-out the instructions, without the added complexity of a full-feature word processor.

Other, non-academic areas in which computers can be put to good use are needlework, cookery and home budgets. At least two useful types of program can be envisaged in the field of cookery alone.

The aim of the teaching program I have in mind would not be the mere act of typing recipes into the computer but to teach students the format in which a recipe should be recorded, how to search through a collection of recipes to find a suitable combination of courses, how to establish the quantities of ingredients needed for varying numbers of people and possibly to prepare a shopping list showing the type and quantity of ingredients for a whole meal, separated into different retail shops where the ingredients are likely to be available.

Dietary requirements is a complex subject but much of it could be taught on a computer. Three aspects of dietary requirements could be taken into account — to ensure that the meal is nutritionally balanced; to take into consideration special dietary needs; producing slimming diets which are reasonably satisfying and varied.

The program I envisage would hold recipes in data files and the learner would be given the task to browse through them to select a daily or weekly menu based on some or any combination of the points mentioned.

I am aware that the task of selecting the menu and costing the ingredients could be done on a database manager, for instance Archive, but my program would teach the student which factors to consider and how to make choices.

The home budgets topic shares common ground with some arithmetic teaching tasks but it makes a world of difference that we are here teaching arithmetic as a practical application.

Many students, even those who aim at higher level GCSE passes, have difficulty with percentage calculations. I have found that many of the difficulties either disappear or are at least reduced when the topic is presented as part of an exercise which has practical relevance, such as calculating the maximum amount of mortgage which could be raised on a given salary. The next question is to prepare an estimate of all the other

expenses and to establish how much money will be left each month.

The complexities of the questions should be varied with the ability of the learner by asking the user to enter the level of difficulty at the beginning of the program.

As an example of more involved questions, consider the situation where a student, having allowed for mortgage, house insurance, rates, gas, electricity and the multitude of other household expenses, and having worked out a monthly budget, is told that he is to receive a rise of 5.5 percent per annum, pre-tax.

How much can he undertake to pay for a car on hire purchase? The program must guide the student to take into account not only the monthly repayments on the car but also road tax, insurance and service costs. A program of considerable size and usefulness could be built.

Pilots learn the skills necessary for flying an aircraft through a simulator, which is essentially a sophisticated computer program. Admittedly, the most successful commercial flight simulators use analogue techniques; while the QL is a digital computer, it could still be used as a high-quality flight simulator.

There is no reason why similar techniques should not be used to teach people how to drive cars, motorcycles and bicycles safely.

Simulation programs of this type would be very complex and it probably would not be viable to write one for profit, unless the author is a highly-accomplished programmer. The program would have to be written in assembler to be fast but anyone could write a simple simulation in SuperBasic for home consumption.

I have often wanted to write a program to teach map-reading but I have not managed to find time. It is likely that I had the desire because I am hopeless at map-reading. It may sound a contradiction but it is true that writing educational software often helps the programmer as much as it helps the student.

In these areas of teaching DIY and leisure activities you should not be deterred by the fact that you may not be an expert at the chosen subject. There are areas where expertise is necessary and I have pointed this out in the past in connection with writing mathematical teaching programs.

In the area being considered, expertise is not required initially. It is, however, necessary to acquire the specific knowledge as the work progresses on the program. Other leisure activities in which educational programs would be useful include such diverse fields as coastal navigation, sailing a small dinghy, amateur radio and astronomy. There are very few areas where a computer could not be used for teaching.

As an example, I will develop an algorithm to teach payroll calculations. The calculation refers to a small firm with fewer than 10 employees. The algorithm has been designed for the purpose to teach students the elements of how to calculate gross pay, nett pay, income tax and other deductions. It is not necessarily correct so far as the Inland Revenue is concerned.

Establish the definitions of hourly rate, number of hours worked, standard time, overtime, weekly gross income, tax allowance, taxable income and National Insurance contributions. Display the definitions on the

screen until the student signals they are understood.

Check the basic definitions by asking questions and evaluating the response. In the evaluation process, allowance must be made for the fact that the response does not necessarily have to be correct verbatim. Use method of keyword searching.

Do for first employee:
  Hours worked = random (0 to 40)
  Hourly rate = random (3.5 to 10)
  Standard hours = 37.5
  State overtime hours (if any)
  Tax allowance = random (£2,400 to £6,000) per annum
  State tax allowance per week
  State taxable income
  Calculate tax and NHI contributions
  Display all this information on-screen
  End do loop.

Do for second and subsquent employees:
  All steps requiring student to calculate number of hours of overtime, tax allowance per week, taxable income, income tax and National Insurance deductions.
  Evaluate all answers; if incorrect then show correct calculation on screen.
  End do loop.

If student wishes to continue:
  If total marks > = 50% then go back to 4
  If total marks > = 40% and < = 30 then go back to 3
  If total marks < 30% then go back to 2
  Else
  If student does not wish to continue — show total marks.
  End if.

You may have noticed that, the algorithm looks like a mixture of Basic and Pascal lines. This technique is called pseudo code because it is not an established computer language but looks similar to some. It saves a great deal of writing, enabling us to express our thoughts in a condensed way and yet, at least to those who are familiar with either Basic or Pascal, it is truly meaningful.

Pseudo code is not a rigid language; you may invent your own rules, so long as you understand them. Bear in mind, though, that if others have to read and understand your algorithms, it would help to follow at least the basic rules of one or the other of the established computer languages. Because Pascal is considered to be one of the most highly-structured, high-level languages, pseudo code is often written to resemble a Pascal program. I must say that this view is becoming more and more out of date, in my opinion; good versions of Basic are just as structured as Pascal but easier to learn. So feel free to write pseudo code in a form which resembles Basic.

A good program is useful whether or not it is educational. The question is whether or not it is a sound proposition to invest a good deal of effort in it. There is no doubt that educational software does not command the same high returns as computer games. On the other hand, probably less effort is needed, particularly since most educational programs can be written in Basic and possibly compiled afterwards, though that is not strictly necessary.

Bear in mind also that there is a considerable shortage of good educational software, particularly for the QL. I would say that, on a financial basis, it is worth writing educational software but great care is needed to see that it is good and that it fulfils its exact requirements.

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Out of the SHADE

Already famous as a text editor, The Editor now has document handling enhancements. Ron Massey investigates.

One of the few programs which has an almost universal appeal and is, at the same time, the most useful to computer users is one which includes a range of commands for managing text. The most common type of text editor is the word processor and the QL Quill, even with its various shortcomings, is one of the better word processors and certainly one of the easiest. Conceptually, Quill is a what you see is what you get type of word processor; its screen is a close approximation to the way a document will be presented in hard copy.

One of the disadvantages of the QL version of Quill is that some of its processes can be annoyingly slow. Other limitations, such as a maximum starting page number of 255, restrict its usefulness for users working with very large documents. Other limitations include a limit of a single line for document headers and footers.

Released originally in response to the many shortcomings of other QL text editors during the latter part of 1986, the latest and definitive version of the Digital Precision *The Editor* has expanded the range of commands available to the user so that The Editor is now one of the most powerful programs available for the QL.

The Editor differs from Quill in a number of important aspects. Quill files incorporate document formatting information. When Quill is given the LOAD command and a file name, it looks for a distinctive file header, indicating that it is a Quill —doc file:

chr$(0) chr$(20) vrm1qdf0 chr$(0) chr$(0)

If this file header becomes corrupted in any way, Quill will refuse to load the document and report a loading error. Pure text files which do not have formatting information can be loaded with the Quill Import option, provided the filename follows the Quill convention of a maximum of eight characters and a three-character extension.

Saving a Quill file will save the document and add all the Quill document formatting data, appending the —doc filename extension automatically.

Alternatively, a Quill document may be saved with the PRINT command by pressing <F3> <P> <ENTER> < ENTER> and substituting a drive and filename when asked if the file is to go to the printer. Such files have the a —lis extension added to them.

Structurally, Quill —lis files are exceptional in that they are headed by the printer driver preamble code. A —lis document also includes all printer mode switching characters.

Although intended nominally as a tool for processing text-type documents it is accurate to describe The Editor as a universal file processor and it is distinguishable from a dedicated word processor in several significant ways.

The Editor will operate on any type of QL file — ASCII files, such as SuperBasic programs or documents and binary files such as machine code programs and screen dumps.

ASCII, or more simply text, files may be read by The Editor in either of two ways, each of which has particular applications — the Read (R) mode, which is the more usual mode for general management of text files.

The second mode, Read Document (RD), command will read a text file, format it to either the parameters set with Editor configuration routine or set up when the document is loaded.

When used to edit binary files, files are loaded with the RU command. The Read Unformatted command will load a file without formatting it to whatever "page" parameters are in the usual document modes and always defaults to over-write mode.

If in the RU mode, the character code under the current cursor position is indicated on the information line at the bottom of the screen. EXECutable programs — programs started with EXEC or EXEC—W — can be modified with The Editor and saved with the W command. In this way, you can alter screen prompts or, in many cases, the default drives and other options of almost any program.

Saving any type Editor file is done with the W (Write) command and the file incorporates only the information which is present in memory and visible on-screen, offering to over-write a file with the same name.

Setting-up The Editor so that it will format the current document may be done in either of two ways — by building a command file and reading it with the RC command or by heading a document with a command line beginning with ";" and, with the cursor on that line, entering the EX (Execute) command.

Quill navigational aids — cursor move, block copy, delete and erase — impose a number of limitations on the user and occupy the command queue exclusively. If you wish to move a block of text from the bottom of a document to the top you mark the block with the Copy command and down both <SHIFT> and <UP> keys until you are at the top of the document. If the document is large it can take a considerable time.

Editor navigation, on the other hand, requires only that you mark the specified block with the Block Start and Block End commands. The command queue is immediately freed and you can proceed with movement to the area to which you wish to move or copy the defined block.

Written entirely to Qdos standards, The Editor can be multi-tasked. In simple terms it means that two or more copies of The Editor may be run at the same time or with other programs started with the EXEC command — in this case, you switch between

General hotkeys

Edit & execute last find/exchange	SHIFT/F2
Edit & execute last command group	SHIFT/F3
Execute; re-execute command group	F3, F2
Force garbage collection	SHIFT/F5
Interrupt/halt commands	ESC
Redraw/resize screen	F4, SHIFT/F4
Re-execute last find/exchange	CTRL/F2
Start command processing	ENTER
Toggle overstrike & insert mode	F5

programs by pressing <CTRL> and <C>) or from within a multi-tasking manager such as *Taskmaster*, *QRAM* or *QL Switch*.

If you list a directory of the disc or cartridge containing The Editor program you will note immediately that the range of the facilities and the thought which has gone into its structure as a working system has been enhanced.

Two new files, "EDTprt—bin" and "DRIVER—dat" have been added to the system. The former is used to print files saved to disc or cartridge. The latter, structured like a command file, is the configuration data for your printer and can be modified or appended with The Editor.

Other enhancements include an expanded "HELP" file. Although it now covers five pages, you can customise this file easily to your requirements. The HELP file is easily extendable by reading "EDT—help" into The Editor and making the additions.

As supplied, all that is prudently needed to get Editor up and running is to make a back-up copy, re-set your QL and run its boot. However, the system defaults as supplied may not suit you. To organise Editor to your requirements, run the routine "EDT—config—bin". Prompts will allow you to alter many of the Editor startup parameters.

When first started, Editor looks for a file called "boot—cmd" in the default program drive. The file supplied is a demonstration command file.

Typical "boot—cmd" files can contain commands for setting-up page formatting, such as tabs and margins, or customised user prompts may be initialised prior to loading a document or input of standard text information. If this file is not available, Editor will open with its usual blank screen.

The Editor screen consists of two main parts, with four sub-displays. The main screen is where the file is displayed. A window positioned below the main screen serves three purposes — an information line, command input and an error response prompt. The information line provides information regarding cursor line and column position, keyboard input mode and number of lines contained in the current document. The command line is accessed by pressing <F3> and any errors, such as End of File, are indicated on the information line.

The Editor imposes no restrictions on the data or command characters which can be entered by the user. In addition to the normal ASCII character set — from CODE 32 to 191 — control characters — ASCII codes 0 to 31 — are indicated by The Editor character set.

Users have the option of constructing their own character sets with a separate program, such as *Eye-Q* or *Turbo Toolkit*. The custom font should be saved under the name of "EDT—charset" or, alternatively, the font filename for which Editor will look can be changed by using the "EDT—config—bin" routine.

The number of ways The Editor can be used are endless. More obvious examples include using it as a tool for program development, especially for high-level languages such as SuperBasic, C, Pascal, Archive or BCPL.

The Editor provides a convenient means of generating or appending libraries of modules, implementing global or selective alterations and generating original source code for use by, as one example, compilers. Other applications include using The Editor as:

A database manager. Lists comprising names and addresses or catalogue can be maintained with ease. By structuring a list of groups or categories, details according to type can be catalogued for specific types of output, such as printing labels.

Using the powerful extended command structure, The Editor can be used to generate test data files rapidly.

Creation or re-organisation of lightly- or heavily-formatted documents.

In some cases The Editor can be used to recover files not readily repairable by other means.

Create and maintain sorted lists, formatted in a variety of ways.

My experience with The Editor has ranged through the entire repertoire covered and I have found no other program to equal it. When its extensive and powerful command structure is used fully, it can take on some aspects of a programming language.

Another of the new features included in the definitive DP version of The Editor is an option to change the INK and PAPER colours of the main screen, command line and the error line from within the program. Previous versions of the program required that Editor be configured to individual requirements prior to use.

While not a great hardship, it meant that if you were multi-tasking several copies of The Editor and you wished to "colour code" the screens for easy identification, you also needed two or more copies of the program on a volume. Using The Editor new "BOOT—CMD" feature you can now set up a command file to prompt for setting screen colours on start-up of each version of the program you are running.

Default parameter	Supplied default	Options
Screen mode	Mode 4	4 or 8 (high- or low-resolution)
Data entry mode	Insert	Overwrite or insert
Horizontal pan	75%	10% or 90%
Cursor delay		1 to 3000
Block definition	Line	Line, character or column
Block indication	Hide	Hide or show
Screen colours	—	Mode 4 colours
Max line length	256 characters	Up to 1,000 characters
Tabbing interval	3	—
Right-hand margin		—
No. of search$	3	1 to 6
Search$ length	60	40 to 256
Font filename	"EDT—charset"	Any up to 12 characters
Help filename	"EDT—help"	Any up to 12 characters
Prog device	flp1— or mdv1—	Any.
Data device	flp2 — or mdv2—	Any.
Curser delimiters:		
Movement	SPACE,:;:()	
Search	SPACE,:;:() = < > & + — '/`:/:[][]#"'	
Screen size	Small	Any.

Often it is desirable to have a back-up of a disc on which the files appear in the directory in a particular sequence, either alphabetically or grouped according to sets of program-related files. Using the usual COPY command can be tedious and time-consuming for a disc-based system and wildcard copying, while better than backing-up file-by-file, can be equally time-consuming.

One of the many uses to which I put The Editor is creating, first of all, a sequenced file from a directory of a disc I want to back-up and, second, a set of DATA lines which I add to a master back-up program. To make a directory file, put the work disc in drive one, a scratch disc in drive two and type:

OPEN—NEW#3,flp2—filename : DIR#3,flp1— : CLOSE#3

Load this file into Editor with the RU command, switch

Two versions of the Editor multitasking with a superimposed Basic window.

Mode	Input Default	Use	Special Features
R	Configurable	Universal text document input.	1. Word count available with SH command.
RD	Configurable	Formal document formatting.	2. Page number indicated on information line. 3. Automatic page numbering — arabic or roman 4. Page numbering justified left or right. 5. Hard and soft page breaks indicated optionally. 6. One to nine lines of document headers and footers.
RC	———	For entering commands from a command file only.	
RU	Overwrite	For editing any type of file.	1. ASCII characters are indicated on information line.

NOTE: INPUT defaults may be toggled between Insert and Overwrite by pressing <F4>.

input mode to INSERT and delete the top two lines — the disc format name and the sector data. You can then make alterations to the directory as required — setting the case of the filenames and sequencing. Once that is completed, save the modified file with the W command. This will over-write the old file. Next, enter the following command:

<F3> RP CE E/// N Press <ENTER>

This will put the cursor at the end of the line and insert CHR$(32) — a space — at the end of each entry. Go back to the top of the column and insert "DATA" followed by the number of files in the directory and "," in the column preceding the first filename. Next enter the following command:

<F3> J E/ /',"/

Your next directory item will be joined to the current line and the space — CHR$(32) — will be exchanged for "","". Press <F2> — (repeat last command — as many times as required to fill out the current line. Once the line is complete, delete the space following the last filename and type "". Repeat the process for as many lines as are available.

You will then have a block of completed DATA statements. Assuming the last line number of your master back-up program is 1000, type-in the following:

T BS B BE RN 2000,10

Once your DATA statements are line-numbered you can merge your master back-up program with AF command. Move the cursor to the top of the file, press <ENTER> — to give you some elbow room — and merge the back-up program. All that remains is to delete the empty line at the top of the file and save it with the W command.

To a writer, one of the more endearing functions of The Editor is its ability to construct automatically indices and tables of contents from a document. Assuming that a document incorporates distinctive chapter or section headings, it is possible, with a single command, to extract these headings and position them at the bottom of the current document. If you use section headings like "3.1.0", a typical command for constructing an index from a document would be:

B SM T 150 (F(/./ + /./) BS BE B BI CB CE

This sequence will put an index of all occurences of lines containing two fullstops at the bottom of the current document. Obviously, some lines will include two or more sentences and they, too, will be copied.

Once Editor has constructed the block of references, all that remains is for you to go through the block, delete any extraneous data and sort the index in numerical or alphabetical order. To execute a sort, go to the top of the index and enter:

BS B BE

If the sort is to be numerical, input SQ; if alphabetical, input SQ and the number of the column in which the first and all subsequent first characters appear.

Another extension of this application is for constructing catalogues of your discs or cartridges. Assuming you have the disc you wish to catalogue in flp1—, type:

OPEN—NEW#3,flp1—filename : WSTAT#3,flp1— : CLOSE#3

Read this file into The Editor with the R command and enter the following on the command line, with the cursor at the top of the file:

RP 24CR J N

This will move the cursor repeatedly 24 spaces to the right, join the following line and move to the next line until the cursor reaches the end of the file. Files organised in this way can then be sorted by name, size, date or time.

One of the more serious omissions from Quill is a facility to sort lines in a specified order. If there is a need for sorting the contents of large documents originated in Quill, —lis or —doc files could be read into earlier versions of The Editor, the file sorted and then re-saved. The completed document could then be Imported into Quill where changes in typeface were required, and printing could start.

From the point of view of The Editor the formatting information required for the Quill —doc file is so much rubbish. Also since page layout is not in a readily-readable form, Editor is supplied with a command file to perform most of the conversion required to convert a —doc file into a readable format.

It is scarcely surprising the con templation of this con-

tinual file interchange proves to be somewhat less than attractive. The new Editor Document mode, however, makes swapping files a thing of the past.

There are two ways to enter the document mode — with the RD command (Read Document) or, if a document has been input with the Read command, inputting the MD (Make Document) command. The latter command will convert a file in memory into a formalised document, including page breaks.

Superficially, documents presented in this mode appear the same as if read in the standard READ mode with two immediately apparent exceptions:

Pressing <F3> and entering SH on the command line will show the system status as being in document mode and indicate a word count which is user-definable with The Editor configuration program.

The information line shows the current page number.

The main differences, however, are less obvious and put The Editor into the class of an exceptionally powerful word processor.

In addition to the usual range of commands, soft or hard page break positions may be indicated optionally on-screen; other command lines, indicated by a semi-colon in column one, may be included in a file but will not be printed.

If you elect to display soft page break, Editor has to do a considerable amount of character processing and, because of this, may be slowed somewhat. Because of this, DP recommends that the page break position option is left set to OFF during input of text.

One other point should be observed with command lines. If a document is created in which you have included one or more command lines while in the Read mode and then saved, they will be displayed if the document is loaded subsequently by the RD command. If, however, the characters are not recognised by Editor as legal command character lines they will not be displayed.

Defining a file as a document has two important ramifications; lines beginning with ";" in column one are non-printing lines and will not be included in a line count for paging. Second, Editor regards "non-display" characters as printer control characters and does not consider them as occupying space on a line. The visible effect is that the column indicator is not incremented as the cursor moves across those characters. Right-justified paragraphs may appear to lack uniformity on-screen but will appear correctly when printed.

Editor files may be printed in any of several ways. From SuperBasoc, you can input "COPY—N drive—filename" to a printer port. Working from within Editor, an entire document may be printed by inputting:

W-device

Part of a document may be printed by marking the start and end of a block of text and inputting the command:
BW device — where device is either ser or par.

Printing in that way assumes that you set up your printer according to the typeface — condensed, elite and so on — beforehand. Documents will be printed globally — the entire document will be printed in the same printer mode/typeface.

Another method is to insert control codes for your printer where they occur in your document. Since that can be rather tedious while building a document you may find it easier to adopt a convention of using mnemonics where character changes occur — <CTRL> & <B> for switching on bold. Editor will display this character as an over-scored B.

For this application you need to build a command file which will exchange each of the mnemonic characters in a completed document for the ESC code strings used by your printer. Alternatively, you can take advantage of the sophisticated printer driver now supplied with The Editor which, while roughly analogous to the driver system supplied with Quill, is considerably more flexible, will cater for all of the current dot matrix and daisywheel printers available and is much easier to work with.

Once up and running, The Editor printer driver offers five principal menu-driven options — Specify Default Device, Specify Printer Device, Select Printer Type, Commence Printing and Quit. Information regarding the printer types supplied with The Editor package are in a file called "driver—dat". The file is in the pure text command file format in that all lines "seen" by the driver routine must have a semi-colon in column one.

The first line of each printer type starts with the name of the printer and, possibly, some distinctive description of particular features pertaining to each printer type such as page numbering, page length, footer margins, single or continuous paper and so on.

It would be difficult to imagine any single user finding applications for all the powerful Editor features. The question to ask is: "How can I modify a file in the shortest time/easiest way?" You will usually find an answer.

Consistent with manuals supplied with all of the major DP releases, The Editor manual is an impressive document. Expanded to double the number of pages of earlier editions, many practical examples have been included.

Whether it is your intention to modify relatively simple text blocks or produce complex formatting and/or processing of documents or any type of file, it is virtually certain that you will find your work made considerably less labour-intensive with The Editor.

Document management

MD	Make Document from text (in memory) — not available with RU read command.
PH	Page break hide/show
PPL	Specify page length (mandatory range within 6 to 255).

Document print formatting

PHD	(followed by 1 to 9) One to nine lines of document header.
PFT	(followed by 1 to 9) One to nine lines of document footer.
#	To insert page numbering in arabic numerals — left justified.
###	To insert page numbering in arabic numerals — right justified.
#R	To insert page numbering in roman characters — left justified.

File commands

AF	Append from device **
BW	Write block to device **
R	Read text from device **
RC	Read command file **
RD	Read document file **

Big movement commands

B	Bottom of file
GB	Bottom of file
GC	Go to character *
GL	Go to line *
GPB	Go to prior page
GPS	Go to soft page
GP	Go to page *
GT	Top of file
L	Last cmd point
NL	Next longer *
NS	Next shorter *
T	Top of file

Exchange qualifiers:

B	Search backwards
W	Match string is word
Q	Query before exchange
C	Text case is significant
+ = AND	< = begin
- = OR	> = end

Many of the commands listed above are new or revised in the enhanced Editor package.

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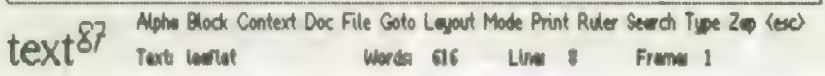

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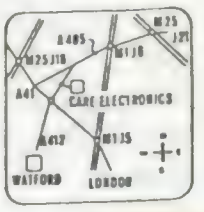

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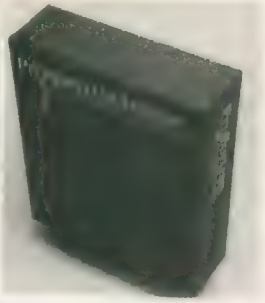

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A.I.

Marcus Jeffrey returns to his artificial intelligence draughts in time to get the computer fighting back

We had completed the skeleton program in the last instalment, November, 1987, including move generation and storage and player input. That allowed two players to use the computer to play the game, with their moves checked for legality.

The next step is to start giving the computer some intelligence to enable it to play the game. With a game such as this, the basis of the computer intelligence is the evaluation function. This is a series of routines which assign scores to a given board position. In the game of noughts-and-crosses longer lines would be given larger scores. In chess, material, pawn advancement, centre control, open rook files and so on, can all have values attached to them.

A. L. Samuel, who wrote the classic draughts program during the 1950-60s, used an evaluation function containing 39 scores, though only 17 were active at any time. During play, the program assigned values to the evaluation routines depending on their effectiveness. If any of the values fell below a previously-assigned minimum, the eveluation routine would be removed to the bottom of a reserve list and a new routine would be taken from the top of the reserve list.

In that way the least effective routines would quickly be returned to the reserve list, leaving the most effective in the true evaluation function. The complete list of evaluation features is given at the end of the article. In addition to those shown, 12 more features were known as Binary Connective Terms and were arrived at by carrying-out Binary 'And's on some of the terms listed and their negations.

Finally, the most important term was material. Rather than assigning a score by subtracting one side from the other, Samuel used a value of the form:

(Side A Material — Side B Material) x
(Greater Material/Lesser Material)

That meant that if it was the program's move — i.e., the computer is Side A — it will tend to exchange materially when it is ahead and avoid exchanges when it is behind. In this month's evaluation we have not employed this method but it will be added during the look-ahead routines in the next article.

Now, to this month's listing. First, there are a few amendments to the listing given in the October, 1987 issue. They are partly to allow for the introduction of the new features and partly to improve the user input, which was found to be a little too basic. To include the new features, replace the original opening — lines 100 to 220 from October, 1987 — with the listing given in figure two. Now add the lines in figure three and execute the command:

```
RENUM 1000; 1000
```

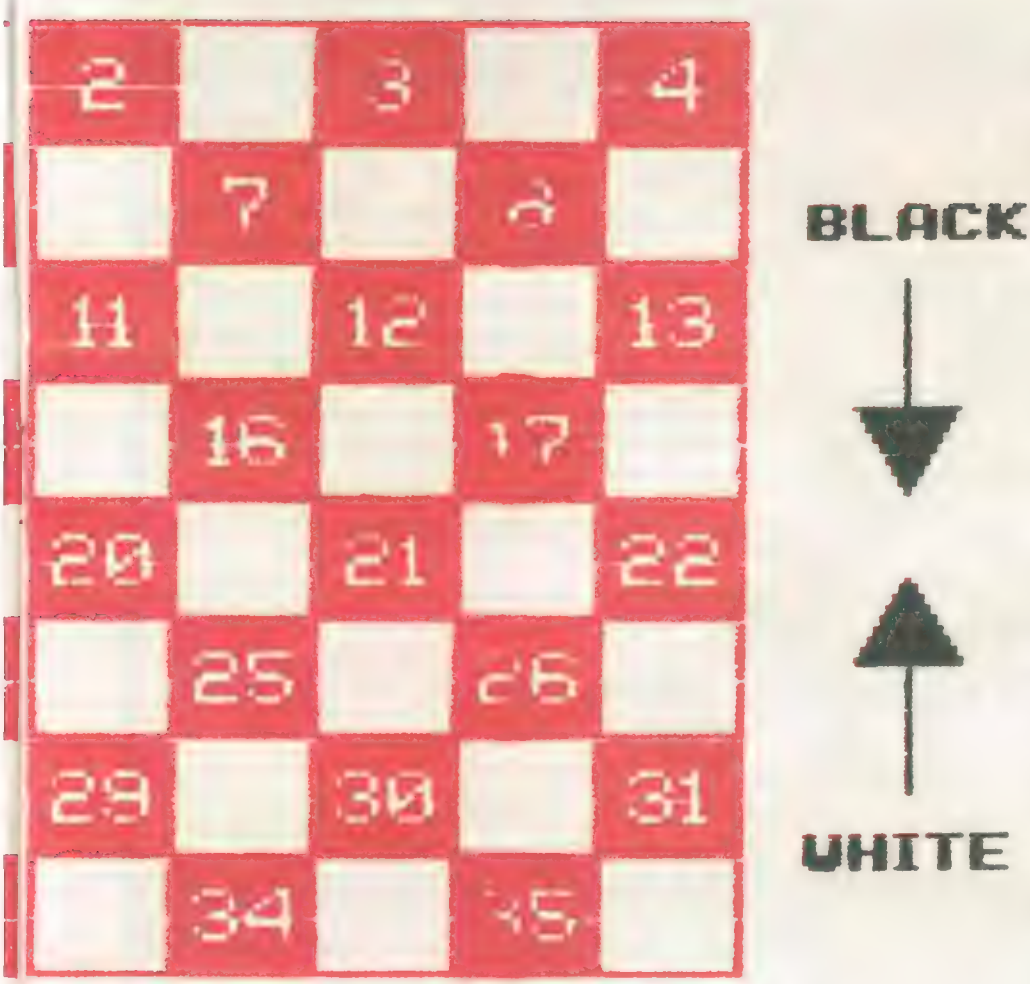
to re-number the lines starting at 1000 in steps of 10. Finally, include the new procedures — figure four — to the end of the program.

The program is now at a stage where you can play against the computer. The computer plays Black and will move first, so be patient when the program starts. You will already find the program slowing, even though only a few evaluation features have been included and anybody owning a compiler will find this a boon. A compiled program should work fast enough for additional features to be added, possibly from the list given for Samuel's program.

You will see that the evaluation function multiplies all its features by the elements of the wg array. They are a series of weights which reflect the importance of the various features. Initially, fairly arbitrary values have been used and you may

Figure two: an amendment to the program of October 1987, to implement some new features.

```
100 REMark ** AI DRAUGHTS **
110 REMark ***   PROGRAM   ***
120 :
130 init_constants
140 init_vars
150 init_board
160 REPeat loop
170   print_board
180   top=1:sc = find_move(board,black)
190   make_move best
200   input_move(white)
210 END REPeat loop
220 :
230 REMark ********************************
240 :
```



BACK (Back Row Bridge)

The parameter is credited with one if there are no active kings on the board and if the two bridge squares (1 and 3, or 30 and 32) in the back row are occupied by passive pieces.

CENT (Centre Control I)

The parameter is credited with one for each of the following squares — 11, 12, 15, 16, 20, 21, 24, 25 — which is occupied by a passive man.

CNTR (Centre Control II)

The parameter is credited with one for each of the squares — 11, 12, 15, 16, 20, 21, 24, 25 — which is either currently occupied by an active piece or to which an active piece can move.

CORN (Double-corner Credit)

The parameter is credited with one if the material credit value for the active side is six or less, if the passive side is ahead in material credit, and if the active side can move into one of the double-corner squares.

CRAMP (Cramp)

The parameter is credited with two if the passive side occupies the cramping space — 13 for Black and 20 for White — and at least one other nearby square — 9 or 14 for Black, 19 or 20 for White — while certain squares — 17, 21, 22 and 25 for Black and 8, 11, 12, 16 for White — are all occupied by the active side.

DENY (Denial of Occupancy)

The parameter is credited with one for each square defined in MOB if on the next move a piece occupying this square could be captured without an exchange.

DIA (Double Diagonal File)

The parameter is credited with one for each passive piece located in the diagonal

Figure three: add these lines after figure two and renumber.

```
1110     DIM m(6),wg(4)
1131     FOR i = 1 TO 4 : READ wg(i)
1132     DATA 5,1,1,2
1781     illegal = FALSE
1782     IF LEN(sq$)<2 THEN illegal=TRUE : RETurn 0
1880 LOCal m_len,i,sq0,sq1,temp
1681     temp = index
2001     move_list(temp) = m_len : index = temp
2100 LOCal t_list(100),sq0,jump_found,start
2111     start = top
2360                  top = start
```

like to try tuning them. In a later article we will see how the program can attempt to tune itself.

Despite its slowness, the program still plays a very poor game and will throw away pieces for no gain. This is due to the lack of lookahead; the program considers only the position resulting from its own move without considering what moves White may play in return.

In the next instalment, we will introduce the Minimax lookahead tree to solve this problem and the alpha-beta algorithm to prune the tree.

Samuel's evaluation features

In the following list, the "passive" side is the side which has just moved and the "active" side is the side whose turn it is to move. So, if you were trying to evaluate Black's position and you considered all the positions available to Black after a Black piece has moved, Black would be "passive" in the following list. The Board notation numbers are shown in figure one.

ADV (Advancement)

The parameter is credited by one for each passive man in the 5th and 6th rows — counting in passive's direction — and debited with one for each passive man in the 3rd and 4th rows.

APEX (Apex)

The parameter is debited with one if there are no kings on the board, if either square 7 or 26 is occupied by an active man, and if neither of those squares is occupied by a passive man.

files terminating at the double corner squares.

DIAV (Diagonal Moment Value)

The parameter is credited with a half for each passive piece located on squares two removed from the double-corner diagonal files, with one for each passive piece located on squares one removed from the double-corner files and with one-and-a-half for each passive piece in the double-corner files.

DYKE (Dyke)

The parameter is credited with one for each string of passive pieces which

A.I.

CONTINUED

```
3260    REPeat scan_moves
3270       IF pres >= 1t THEN EXIT scan_moves
3280       make_move pres
3290       score = evaluate(col)
3300       IF score > high THEN
3310          high = score
3320          best = pres
3330       END IF
3340       pres = pres + move_list(pres)
3350       FOR j = 1 TO 45 : board(j) = b(j)
3360    END REPeat scan_moves
3370    RETurn high
3380 END DEFine find_move
3390 :
3400 DEFine FuNction evaluate(col)
3410 LOCal w,x,y,z
3420    w = material(col)
3430    x = advance(col)
3440    y = centre(col)
3450    z = fork(col)
3460    RETurn wg(1)*w+wg(2)*x+wg(3)*y+wg(4)*z
3470 END DEFine evaluate
3480 :
3490 DEFine FuNction material(col)
3500 LOCal sq,b_tot,w_tot,piece
3510    b_tot = 0 : w_tot = 0
3520    FOR sq = 6 TO 40
3530       piece = board(sq)
3540       SELect ON piece
3550          ON piece = black,bking
3560             b_tot = b_tot - piece + 1
3570          ON piece = white,wking
3580             w_tot = w_tot + piece + 1
3590       END SELect
3600    END FOR sq
3610    IF col = black THEN
3620       RETurn b_tot - w_tot
3630    ELSE
3640       RETurn w_tot - b_tot
3650    END IF
3660 END DEFine material
3670 :
3680 DEFine FuNction advance(col)
3690 LOCal sq,value
3700    value = 0
3710    FOR sq = 15 TO 22 : IF board(sq)=col THEN
value = value + col
3720    FOR sq = 24 TO 31 : IF board(sq)=col THEN
value = value - col
3730    RETurn value
3740 END DEFine advance
3750 :
3760 DEFine FuNction centre(col)
3770 LOCal sq,value
3780    value = 0
3790    FOR sq = 16,17,20,21,25,26,29,30
3800       IF SGN(board(sq))=col THEN value=value+
1
3810    END FOR sq
3820    RETurn value
3830 END DEFine centre
3840 :
3850 DEFine FuNction fork(col)
3860 LOCal t_top,t_pres,j_pos,value
3870    value = 0
3880    t_top = top
3890    generate_moves(col)
3900    t_pres = t_top
3910    REPeat search_moves
3920       j_pos = FALSE
3930       IF t_pres >= top THEN EXIT search_moves
3940       IF move_list(t_pres) > 3 THEN
3950          j_pos = move_list(t_pres+1)
3960          t_pres = t_pres + move_list(t_pres)
3970          IF move_list(t_pres+1) = j_pos THEN
3980             value = value + 1
3990             REPeat next_piece
4000                t_pres = t_pres + move_list(t_
pres)
4010                IF move_list(t_pres+1)<>j_pos
THEN EXIT next_piece
4020             END REPeat next_piece
4030          END IF
4040       ELSE
4050          EXIT search_moves
4060       END IF
4070    END REPeat search_moves
4080    top = t_top
4090    RETurn value
4100 END DEFine fork
```

Figure four: new procedures.

occupy three adjacent diagonal squares.

EXCH (Exchange)

The parameter is credited with one for each square to which the active side may advance a piece and, in so doing, force an exchange.

EXPOS (Exposure)

The parameter is credited with one for each passive piece which is flanked along one or the other diagonal by two empty squares.

FORK (Threat of Fork)

The parameter is credited with one for each situation in which passive pieces occupy two adjacent squares in one row and in which there are three empty squares so disposed that the active side could, by occupying one of them, threaten a sure capture of one of the other two pieces.

GAP (Gap)

The parameter is credited with one for each single empty square which separates two passive pieces along a diagonal, or which separates a passive piece from the edge of the board.

GUARD (Back-row Control)

The parameter is credited with one if there are no active kings and if either the Bridge or the Triangle of Oreo is occupied by passive pieces.

HOLE (Hole)

The parameter is credited with one for each empty square surrounded by three or more passive pieces.

KCENT (King Centre Control)

The parameter is credited with one for each of the following squares — 11, 12, 15, 16, 20, 21, 24, 25 — which is occupied by a passive king.

MOB (Total Mobility)

The parameter is credited with one for each square to which the active side could move one or more pieces in the normal fashion, disregarding the fact that jump moves may or may not be available.

MOBIL (Undenied Mobility)

The parameter is credited with the difference between MOB and DENY.

MOVE (Move)

The parameter is credited with one if pieces are even with a total piece count — 2 for men, 3 for kings — of less than 24, and if an odd number of pieces are in the move system, defined as those vertical files starting with squares 1, 2, 3 and 4.

NODE (Node)

The parameter is credited with one for each passive piece surrounded by at least three empty squares.

ORED (Triangle of Oreo)

The parameter is credited with one if there are no passive kings and if the Triangle of Oreo — squares 2, 3 and 7 for Black and squares 26, 30 and 31 for White — is occupied by passive pieces.

POLE (Pole)

The parameter is credited with one for each passive man surrounded completely by empty squares.

RECAP (Recapture)

This parameter is identical with Exchange, as defined. It was introduced to test the effects produced by the random times at which parameters are introduced and deleted from the evaluation polynomial.

THRET (Threat)

The parameter is credited with one for each square to which an active piece may be moved and in so doing threaten the capture of a passive piece on a subsequent move.

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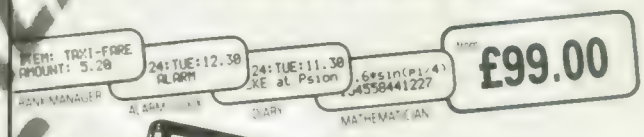

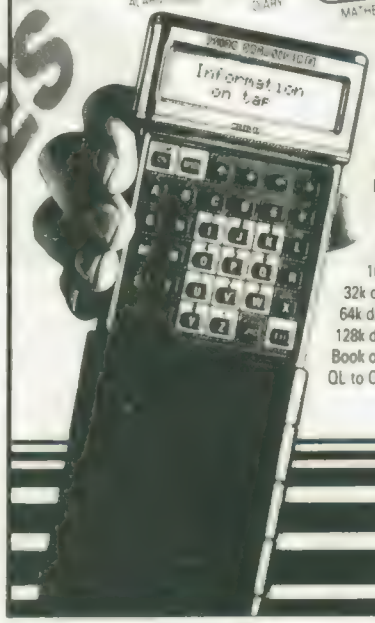

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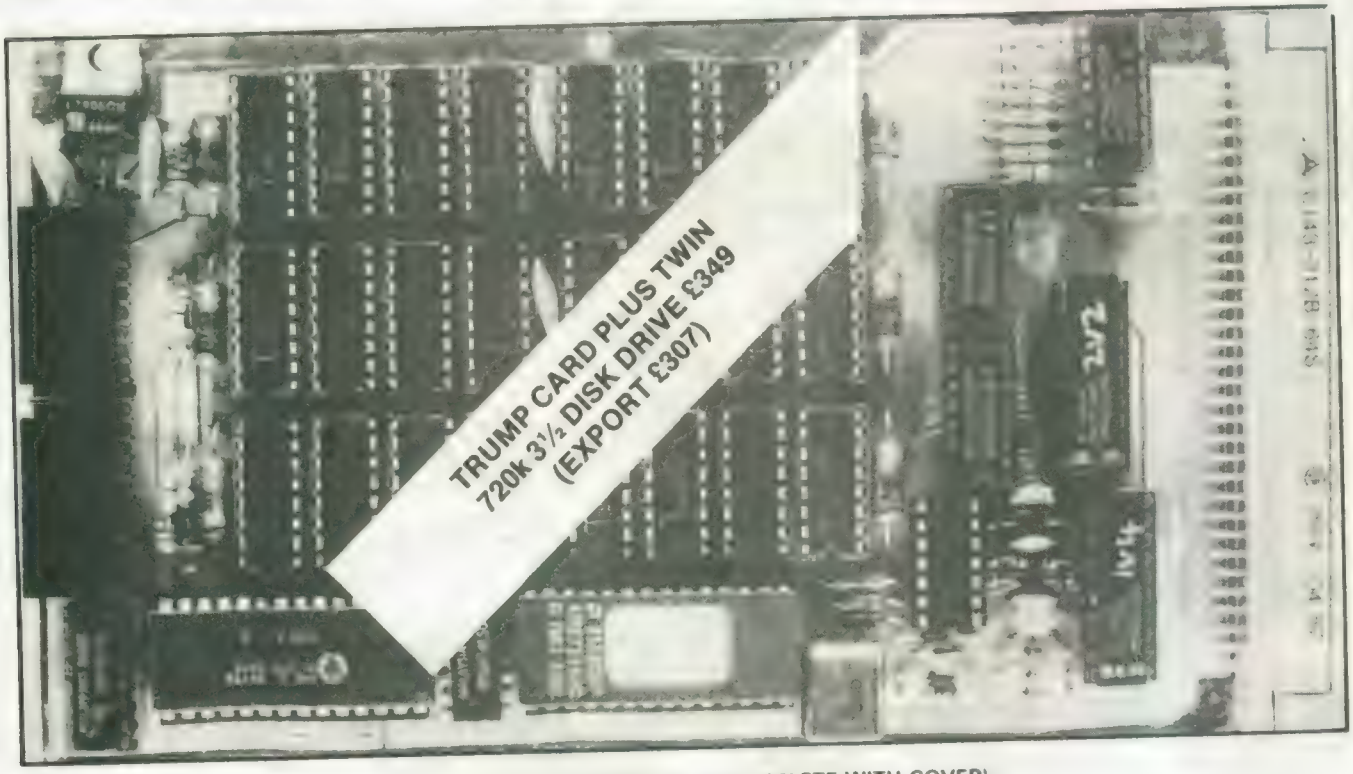

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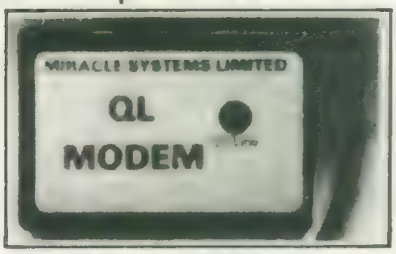

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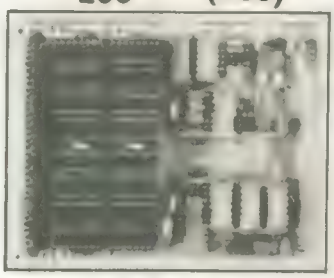

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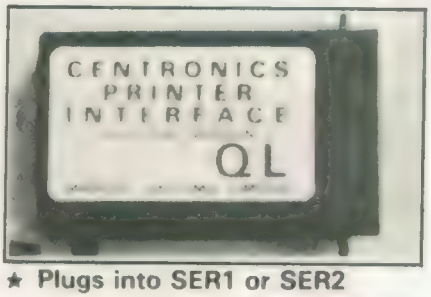

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DIY TOOLKIT

Each month Simon Goodwin adds new commands to the QL repertoire. This month he resurrects the USE command.

Sinclair in January, 1984, handed out impressive-looking copies of the QL User Guide at the launch of the machine. The computer was far from finished and the guide was more a shopping list than a specification. Many of the features and commands listed were absent from the finished machines which appeared in the summer of 1984. Some of the promised features, like error trapping, were added later by Sinclair but have never worked properly under the interpreter. Others, like multi-tasking SuperBasic, have been fixed by the introduction of third-party products like *Supercharge* and *Turbo*.

Now *DIY Toolkit* is included, with a short listing which implements the 'USE' command first mentioned in the provisional User Guide.

USE is, as you might expect, a useful instruction which lets you change the default channel used by SuperBasic commands like PRINT, INPUT, CLS and so on. A full list appears in table one. USE woprks in compiled programs as well as in interpreted ones. It is very fast, saves typing and makes programs easier to read and test.

It is common to find lines like this in a program:

INK #3,2:PAPER #3,7: OVER #3,0:CLS #3:CSIZE #3,1,0:AT #3,1,2.

Unless you are using the default channel, #1, you must put a hash and the channel number before every channel command you use. The channel numbers clog the listing and it is easy to forget or mistype one of them, especially if you are writing a complicated program.

If you are not careful you may find pieces of file data appearing on the screen or vice versa. Sometimes commands mysteriously do not work or affect the wrong channel. I have seen many mistakes like this in programs I have been asked to debug or publish.

The USE command lets you get rid of all those hashes and channel numbers by changing the default channel under program control. It is still possible to make mistakes but it is much easier to spot them. USE lets you write the last example like this:

USE 3: INK 2: PAPER 7: OVER 0; CLS: CSIZE1,0: AT 1,2

The longer the sequence of commands, the more advantage you get from USE. You can still put in explicit channel numbers, as normal, if you want to tweak a channel you are not USEing.

The effect of USE continues until you USE another channel. You can re-instate the normal default, channel 1, with USE 1, or USE on its own. If you like to put hashes in front of channel numbers, USE will not prevent you doing so but it does not require them.

USE gives the standard 'channel not open' report if you specify a channel which does not exist or has been closed. You are told 'bad parameter' if you supply more than one parameter and 'error in expression' if the command cannot determine which channel number you mean.

As usual there are two listings. Listing one is the assembly code program, assembled using the HiSoft *DevPac*. You can type this text into your assembler if you want to customise the code or merge it with other routines.

Listing two provides a quick way to enter the code without using an assembler. It loads the equivalent machine code from DATA statements and saves the code in a file. Once you have loaded that file you can use USE in your programs. These commands load the code file:

base = RESPR(146) : LBYTES "file name",base : CALL base

The first part of listing two is Marcus Jeffery's standard loader, used in every month's DIY Toolkit project. Only the DATA, from line 590 onwards, changes each month.

The program in listing one is straightforward. The START routine calls BP.INIT, the ROM vector which adds new commands to SuperBasic. The table labelled DEFINE gives the name and address of the new command to be added.

The main code starts at CH-USE. If there are no parameters pointed at by A3 and A5 we re-set channel one to the standard values it contains when turning on the QL.

```
100 REMark : Sinclair QL World
110 REMark : ** HEX  LOADER **
120 :
130 CLS
140 RESTORE
150 READ space
160 start = RESPR(space)
170 PRINT"Loading Hex..." : hex_load start
180 INPUT"Save to file. .";f$
190 SBYTES f$,start,byte
200 STOP
210
220 :
230 DEFine PROCedure hex_load(start)
240 :
250    DEFine FuNction decimal(x)
260    RETurn CODE(h$(x))-48-7*(h$(x)>"9")
270    END DEFine decimal
280 :
290 byte = 0 : checksum = 0
300 REPeat load_hex_digits
310    READ h$
320    IF h$="*" : EXIT load_hex_digits
330    IF LEN(h$)<>2*INT(LEN(h$)/2) THEN
340       PRINT"Odd number of hex digits in: ";h$
350       STOP
360    END IF
370    FOR b = 1 TO LEN(h$) STEP 2
380       hb = decimal(b) : lb = decimal(b+1)
390       IF hb<0 OR hb>15 OR lb<0 OR lb>15
400          PRINT"Illegal hex digit in: ";h$
```

```
410          STOP
420       END IF
430       POKE start+byte,16*hb+lb
440       checksum = checksum + 16*hb + lb
450       byte = byte + 1
460    END FOR b
470 END REPeat load_hex_digits
480 READ check
490 IF check <> checksum
500    PRINT"Checksum incorrect. Recheck data."
510    STOP
520 ELSE
530    PRINT"Checksum is correct"
540    PRINT"Data entered at: ";start
550 END IF
560 END DEFine hex_load
570 :
580 REMark : Space requirements for machine code
590 DATA 146
600 :
610 REMark : Machine code data
620 DATA "43FA000A34790000","01104ED20001000C"
630 DATA "0355534500000000","0000BBCB6624226E"
640 DATA "003043E9002823BC","00010001E8007004"
650 DATA "588942B1E80051C8","FFF870502380E804"
660 DATA "604441EB0008BBC8","6644347900000112"
670 DATA "4E92663C3031E800","0C40000167C0226E"
680 DATA "00307228C0C1D089","B0AE00346C1C2A36"
690 DATA "08006B16D2897409","2DB6080018005880"
700 DATA "588151CAFFF47000","4E7570FA4E7570F1"
710 DATA "4E75","*",12279
```

```
* QL WORLD DIY TOOLKIT March: USE procedure;
* Version 0.2, Copyright 1988 Simon N Goodwin.
*
start     lea.l    define,a1
          move.w   $110,a2      BP.INIT vector
          jmp      (a2)
define    dc.w     1            One procedure
          dc.w     ch_use-*
          dc.b     3,'USE'      [ channel% ]
          ds.w     0
          dc.w     0,0,0        No functions
*
ch_use    cmp.l    a3,a5        Any parameters?
          bne.s    read_ch      Yes, work 'em out
reset_chl move.l   $30(a6),a1   A1.=CHTAB offset
          lea.l    40(a1),a1    Set channel 1's ID
          move.l   #65537,0(a1,a6.l)
          moveq    #4,d0        Clear (4+1) longs
clear_chl addq.l   #4,a1
          clr.l    0(a1,a6.l)
          dbra     d0,clear_chl
          moveq    #80,d0       POS.=0, WIDTH.=80
          move.l   d0,4(a1,a6.l)
          bra.s    no_error
*
* Read the channel number into D0
*
read_ch   lea.l    8(a3),a0     Predict end of table
          cmp.l    a0,a5
          bne.s    bad_param    Allow one parameter
          move.w   $112,a2      Vector to get integers
          jsr      (a2)
          bne.s    bad_exit
          move.w   0(a1,a6.l),d0
          cmpi.w   #1,d0        USE #1 means reset
          beq.s    reset_chl
*
* Track down the data in the channel table
*
          move.l   $30(a6),a1   A1.=CHTAB offset
          moveq    #40,d1       D1.=CHTAB entry size
*
* Check channel number in D0 and convert to offset
*
chan_sel  mulu     d1,d0        Channel table size
          add.l    a1,d0        Add base offset
          cmp.l    $34(a6),d0
          bge.s    what_chan    Past end of table?
          move.l   0(a6,d0.l),d5
          bmi.s    what_chan    Closed if negative
          add.l    a1,d1
*
* Copy from entry offset by D0 to entry offset by D1
*
          moveq    #9,d2        DBRA copy 10 longs
copy_ch   move.l   0(a6,d0.l),0(a6,d1.l)
          addq.l   #4,d0
          addq.l   #4,d1
          dbra     d2,copy_ch
*
no_error  moveq    #0,d0        All's well
          rts
what_chan moveq    #-6,d0       CHANNEL NOT OPEN error
          rts
bad_param moveq    #-15,d0      BAD PARAMETER error
bad_exit  rts
          end
```

Otherwise we check there is only one parameter, the Basic channel number, and read its value. If it is channel one we re-set the channel as before. Otherwise we look it up in the SuperBasic table of channel details. If the corresponding entry starts with a negative value, or is outside the limits of the table, we report CHANNEL NOT OPEN.

Finally, we copy the 40 bytes of SuperBasic channel information from the specified channel entry to channel one. That means that attempts to use the default channel will pick up the information associated with the channel specified as a parameter of USE.

USE works only with commands which default to channel one. This is the default for all the standard QL commands apart from LIST, which uses channel 2, and INKEY$, which for some bizarre reason uses channel 0.

Most add-on commands in commercial toolkits assume channel one unless you tell them otherwise, so they work well with USE. For instance, USE works well with all the channel commands in Turbo Toolkit, the HiSoft Super 'B' ROM and Speedscreen extensions. Supertoolkit 2 steps out of line by defaulting to channel 0, 1, 2 or even 3, depending on the exact command you are using. If in doubt, consult your toolkit manual.

Another possible source of confusion stems from the way USE and SuperBasic work. Most of the details of a channel, such as the INK and PAPER colour, cursor position and so on, are stored by the operating system. Some facilities were added at the last minute and work only from Basic. The last graphics co-ordinates, the turtle graphics direction, pen position and line width — for files, not for the screen — are recorded by SuperBasic and depend on the exact channel number being used.

USE copies this information to channel one when you select a new default but it does not copy it back to the original channel later. It does not save the previous values for channel one — USE #1 or USE on its own will re-set channel one information to the initial values — pen up, position 0,0, width 80, direction left-to-right.

You should not rely on SuperBasic to keep track of this information if you USE a channel, then USE another and return to the first one. This quirk could be removed but the existing code works well and the correction would make the listing too long for *QL World*.

The DIY Toolkit will be back in May. If you would like me to explore a specific area or implement new commands, particularly ones unavailable in commercial toolkits, please send your suggestions.

TABLE 1

SuperBasic commands which work with USE

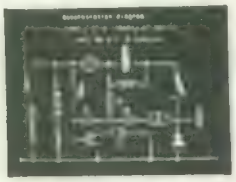
Standard QL commands:

ARC, ARC R, AT, BLOCK, BORDER, CIRCLE, CIRCLE R, CLS, CSIZE, CURSOR, DIR, FILL, FLASH, FORMAT, INPUT, LINE, LINE R, OVER, PAN, PAPER, POINT, POINT R, PRINT, RECOL, SCALE, SCROLL, STRIP, UNDER, WINDOW.

Toolkit commands, among others:

—FOUNT, —XSTEP, —YSTEP, CHANID, CHAR INC, CHAR USE, CUR, CURDIS, CURSEN, CURSOR ON, CURSOR OFF, DLEN, DLIST, EDIT$, EDIT%, EDITF, EXTRAS, FREAD, FWRITE, HEADR, HEADS, HIGHS, JOBS, PRINT USING, PTR, SET FONT, STAT, VIEW, WDIR, WSTAT.

PYRAMIDE



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WANDERER: For the first time, a game which uses the full power of the QL. Spatial effects, combined with fast animation. The objects will LEAP out of the screen! "Cult Game", "The only game worthy of the arcade tag", *Sinclair User*, "Undoubtedly one of the best games released for the QL" *ZX Computing*

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THE P+R:O=G<S

If you have a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG. We pay for everything published at the usual page rates — £80 per thousand words.

Program of the month

RADAR by NIGEL FORD

In stage one the program simulates a radar grid across which an aircraft will fly. The user — i.e., Control — has to request that the aircraft identifies itself. It may take a few seconds' delay while the reply is awaited, during which time the real-time display is changing constantly. Once a reply has been received the call should be acknowledged. In the program *RADAR2* a new aircraft will appear but it is recommended that your first familiarise yourself with *RADAR* before trying the more difficult version.

If no reply is received after five seconds, Control should order an Interceptor to investigate. Further requests for identification can be made by Control or the interceptor which by now will be closer. Control may ask if a visual sighting can be made.

Some of the aircraft will be hostile and so will not identify themselves over the radio. Once Control is satisfied that one is hostile, an order can be issued to shoot it down.

In stage two the central screen shows the interceptor pilot's view as you follow the craft. Attempt to get the intruder into the firing sights. If missiles are fired at this stage the intruder is destroyed and the program returns to Stage 1 for the next aircraft.

To play, switch on or re-set the QL. Insert the cartridge into microdrive 1 and press F2 to select TV mode. A menu will appear. Press 1 to select RADAR. The program can also be started by LRUN MDV1 RADAR.

A short sequence of instructions will appear. They can be speeded by pressing the space bar or skipped altogether by holding down the 'ESC' key.

Stage 1 will now be displayed. A menu at the left-hand side will list the possible actions as outlined. Any option can be selected by pressing the appropriate key, numbers 1 to 9. Alternatively the up and down keys, or a joystick, can be used to highlight an option which is then confirmed with the space bar (fire button). A default option is always highlighted which suggests a suitable action at each stage.

The types of aircraft are set by lines around 2300 and can be changed to suit the user's preferences.

Ordering a shootdown before the Interceptor is within ten miles produces the message 'Out of Range'. The Interceptor should alter course to try to catch it. Some of the pilots are slow to answer so you must make a 'visual sighting' before ordering a shootdown.

The left-hand screen provides a different menu on the shootdowns and although there is still a highlighted option, the space bar will only give 'FIRE'. The other options are selected by the appropirate arrows keys — or joystick.

As you bank left the intruder appears to move right and vice versa. The Intruder will continue to move while your missiles are launched but the cursor keys will be disabled. So long as the centre of the Intruder is in the crosswires a hit is scored.

You cannot return from this stage until a hit is made, but shooting down a friendly aircraft will finish the game.

```
100 REMark radar
110 REMark N.D.FORD
120 REMark 3/8/87
130 help
140 RANDOMISE
150 BASE$='LONGACRES':REMark USE YOUR OWN
LOCATION
 60 alphabet
170 I=60:J=50
180 LAUNCHED=0:sc=0
190 PRINT#2,\'    Press any key to
continue':PAUSE
200 channels
210 grid
220 menu
230 REPeat game
240  ufo
250  CHOSEN=0:C=1
260  HILIGHT
270  score=-1
280  REPeat TRACKING
290   d1=dist(x,y,60,50):d2=dist(I,J,60,50):
d3=dist(x,y,I,J)
300   IF d1>size:CLS#0:EXIT TRACKING
310   IF status=0 AND d1<10:PRINT#0;\\'ENEMY
PLANE OVERHEAD'\'BOMBS DROPPING':STATS:PAUSE
9:RECOL#3;2,3,4,5,6,7,0,1:STOP
320   sc=sc+score-LAUNCHED
330   AT#3,20,20:PRINT#3;score-LAUNCHED;' '
340   AT#3,20,60:PRINT#3;sc;' '
350   display
360   CHOICES
370   ACTION
380   display
390   x=x+SIN(RAD(heading))*SPEED/600
400   y=y+COS(RAD(heading))*SPEED/600
410   IF LAUNCHED
420    I=I+SIN(RAD(B))
430    J=J+COS(RAD(B))
440    IF LAUNCHED=2 AND d2<1:LAUNCHED=0:CLS#0
450   END IF
460  END REPeat TRACKING
470  CLS#5
480  HILIGHT
490 END REPeat game
500 DEFine PROCedure grid
510  INK 0
```

```
 520  size=50
 530  FILL 1
 540  OVER 0
 550  centre:CIRCLE_R 0,0,size
 560  INK 4
 570  FILL 0
 580  FOR r=10 TO size STEP 10:centre:CIRCLE_R
0,0,r
 590  FOR angle=0 TO 360 STEP 10
 600   centre
 610   TURNTO angle
 620   IF angle MOD 30:PENUP:ELSE :PENDOWN
 630   MOVE size
 640   PENDOWN
 650   MOVE -3
 660  END FOR angle
 670 END DEFine
 680 DEFine PROCedure centre
 690  LINE 60,50
 700 END DEFine
 710 DEFine PROCedure ufo
 720  OVER -1
 730  INK 7
 740  dirn=RND(2*PI)
 750  x=size*SIN(dirn)+60
 760  y=size*COS(dirn)+50
 770  heading=INT(course(60,50,x,y))+RND
(-50 TO 50)
 780  status=RND(4)-1:limit status,0,3
 790  SELect ON status
 800   =0:RESTORE 2290:HEIGHT=50000
 810   =1:RESTORE 2300:HEIGHT=40000
 820   =2,3:RESTORE 2310:HEIGHT=20000
 830  END SELect
 840  plane
 850 END DEFine
 860 DEFine PROCedure display
 870  CIRCLE x,y,1
 880  IF d2<size:CIRCLE I,J,.5
 890 END DEFine
 900 DEFine PROCedure channels
 910  MODE 4:CSIZE#0,2,0:CSIZE#2,2,0
 920  OPEN#3,scr_512x256a0x0
 930  PAPER#3,2,0
 940  CLS#3
 950  PAPER 0
 960  screen 4,0
 970  screen 5,400
 980  PAPER#0,2,0:WINDOW 280,175,110,30
 990  CLS#0
1000 END DEFine
1010 DEFine PROCedure screen(chan,left)
1020  OPEN#chan,scr_
1030  WINDOW#chan,100,175,left,30
1040  CLS#chan
1050  BORDER#chan,1,7:BORDER#chan,2
1060 END DEFine
1070 IF status=2:score=5:ELSE :score=2
1080 DEFine PROCedure menu
1090  CLS#4
1100 PRINT#4;'1 IDENTIFY'\\'2 ACKNOWLEDGE'\\'3
INTERCEPT'\\'4 ALTER COURSE'\\'5 RADIO
CONTACT'\\'6 VISUAL'\\'7 SHOOTDOWN'\\'8
RETURN'\\'9 STOP'
1110 END DEFine
1120 DEFine PROCedure STATS
1130 CLS#5
1140 PRINT#5;'Call Sign:'\CALLSIGN$\\'Type:
'\TYPE$\\'Nationality:'\NAT$\\'Heading:'!
\num$(heading)\\'Height: (ft)'\HEIGHT\\'Speed:
(mph)'\SPEED
1150 SELect ON status
1160 =1,3:score=2
1170 =2:score=5
1180 =0:score=-5
1190 END SELect
1200 END DEFine
1210 DEFine PROCedure CHOICES
1220 IF CHOSEN<100:CHOSEN=0
1230 K=CODE(INKEY$)
1240 SELect ON K
1250 =208:change C-(C>1)
1260 =216:change C+(C<9)
1270 =32:CHOSEN=C
1280 =49 TO 57:CHOSEN=K-48:change K-48
1290 END SELect
1300 END DEFine
1310 DEFine PROCedure HILIGHT
1320 OVER#4,-1
1330 BLOCK#4,92,10,0,20*C-20,2
1340 END DEFine
1350 DEFine PROCedure ACTION
1360 SELect ON CHOSEN
1370 =1:PRINT#0;\\'This is'!ba$!'UFO'\'Please
identify yourself . . .':CHOSEN=100:change
3:reset
1380 =2:PRINT#0;\\\ba$!CALL$\'You are clear to
proceed'\\:CHOSEN=0:IF LAUNCHED:change 8:ELSE
:change 1
1390 =3:LAUNCH
1400 =4:ALTER
1410 =5:CONTACT
1420 =6:VISUAL
1430 =7:SHOOT
1440 =8:ABORT
1450 =9:PRINT#0;\\'Type "CONTINUE" to carry
on':STOP:CLS#0
1460 =100
1470 IF delay AND d1<45 AND status=1 OR status=3
OR(status=2 AND d3<25)
1480 PRINT#0;attack$!BASE$\NAT$!TYPE$\
'Flying'!HEIGHT!'ft'\'Heading'!num$(heading)!
'Speed'!SPEED!'mph';
1490 STATS:CHOSEN=0:change 2
1500 IF status=2:AT#0,1,20:PRINT#0;'Radio weak'
1510 END IF
1520 END SELect
1530 END DEFine
1540 DEFine PROCedure reset
1550 finish=DATE+RND(4)+1
1560 END DEFine
1570 DEFine FuNction delay
1580 RETurn (DATE>finish)
1590 END DEFine
1600 DEFine FuNction dist(a,B,C,d)
1610 RETurn SQRT((a-C)^2+(B-d)^2)
1620 END DEFine
1630 DEFine PROCedure LAUNCH
1640 PRINT#0;\ba$!'INTERCEPTOR
1'\'SCRAMBLE'\'Seek and identify craft'
1650 change 5
1660 LAUNCHED=1:B=course(x,y,I,J)
1670 sc=sc-50
1680 END DEFine
1690 DEFine PROCedure ALTER
1700 PRINT#0;\ba$!'INTERCEPTOR 1'\'Change course
to bearing ';
1710 B=course(x,y,I,J):B=INT(B)
1720 PRINT#0;num$(B)
1730 END DEFine
1740 DEFine PROCedure CONTACT
1750 PRINT#0;\inter$!'UFO'\'You are in
restricted air space'\'Please identify . . .'
1760 CHOSEN=100:reset
1770 END DEFine
1780 DEFine PROCedure VISUAL
1790 PRINT#0;\inter$!BASE$
1800 IF d3<20
1810 PRINT#0;'I have visual sighting'\'Target
is'!NAT$!TYPE$\'Flying at'!HEIGHT!'ft'
1820 STATS:change 7
1830 ELSE
1840 PRINT#0;'Target not yet in sight'\\
1850 END IF
1860 END DEFine
1870 DEFine PROCedure SHOOT
1880 PRINT#0;\ba$!'INTERCEPTOR 1'\'DESTROY
TARGET'
1890 IF d3<10
1900 shootdown
1910 SPEED=0
1920 HILIGHT:change 8
1930 EXIT TRACKING
1940 ELSE
1950 PRINT#0;inter$!BASE$!'Target out of range'
1960 END IF
1970 END DEFine
1980 DEFine PROCedure ABORT
1990  PRINT#0;\ba$!'INTERCEPTOR 1'\'Return to
base'
2000  B=course(60,50,I,J)
2010  LAUNCHED=2:change 1
2020 END DEFine
2030 DEFine FuNction course(w,x,y,z)
2040  temp=DEG(ATAN((w-y)/(x-z)))
2050  IF x<z:temp=temp+180
2060  RETurn temp
2070 END DEFine
```

```
2080 DEFine PROCedure change(n)
2090  IF C=n:RETurn
2100  HILIGHT
2110  C=n
2120  HILIGHT
2130 END DEFine
2140 DEFine PROCedure MURDER
2150  STATS
2160  PRINT#0;'You have shotdown an innocent
plane'
2170  RECOL#3,7,6,5,4,3,2,1,0
2180  STOP
2190 END DEFine
2200 DEFine PROCedure plane
2210  p=RND(1 TO 4)
2220  FOR pl=1 TO p:READ TYPE$,NAT$
2230  HEIGHT=HEIGHT+RND(20)*100
2240  CALL$=alpha$(RND(25)+1):
CALLSIGN$=CALL$(1)
2250  CALL$=alpha$(RND(25)+1)&' '&CALL$
2260  CALLSIGN$=CALL$(1)&CALLSIGN$&num$
(RND(999))
2270  SPEED=RND(30 TO 55)*10
2280 END DEFine
2290 DATA 'MIRAGE','ARGENTINIAN','MIG-23',
'RUSSIAN','SU-15','LIBYAN','BACKFIRE
BOMBER','IRANIAN'
2300 DATA 'NIMROD','AUSTRALIAN','B-52
BOMBER','AMERICAN','AWACS','CANADIAN','HARRIER',
'BRITISH'
2310 DATA 'CONCORDE','FRENCH','A3000
AIRBUS','SWISS','BOEING 747','INDIAN','DC-
10','SWEDISH'
2320 DEFine FuNction num$(a)
2330  IF a<0:a=a+360
2340  RETurn FILL$('0',3-LEN(a))&a
2350 END DEFine
2360 DEFine PROCedure alphabet
2370  DIM alpha$(26,9):RESTORE 2390
2380  FOR a=1 TO 26:READ alpha$(a)
2390 DATA 'ALPHA','BRAVO','CHARLIE','DELTA',
'ECHO','FOXTROT','GOLF','HOTEL','INDIA',
'JULIET','KILO','LIMA','MIKE','NOVEMBER',
'OSCAR','PAPPA','QUEBEC','ROMEO','SIERRA',
'TANGO','UNIFORM','VICTOR','WHISKY',
'X-RAY','YANKEE','ZULU'
2400 END DEFine
2410 DEFine PROCedure help
2420 PAPER#2,1
2430 MODE 8:CLS#2
2440 WINDOW#2,448,200,32,16:PAPER#2,1:
CSIZE#2,3,1
2450 AT#2,0,11:PRINT#2,'RADAR'
2460 CSIZE#2,0,0
2470 DATA "You are operating a radar screen to
control Britain's air defenses"
2480 DATA 'Most of the planes will be friendly
so you may let them pass'
2490 DATA 'If they will not identify themselves
you should send up an interceptor','WARNING some
planes have a weak radio so make a visual
sighting before shooting them down'
2500 DATA 'A default action will be highlighted
at the left of the screen.          Press the
space bar to accept it'
2510 DATA 'The default can be moved by pressing
2530 DATA "You can skip these instructions by
holding down 'ESC' next time"
2540 RESTORE 2470
2550 REPeat loop
2560 IF EOF OR INKEY$(0)=CHR$(27):EXIT loop
2570 READ in$
2580 PAUSE 200
2590 PRINT #2,\in$&' ...'
2600 END REPeat loop
2610 END DEFine
2620 DEFine FuNction ba$
2630 BEEP 2000,20:RETurn BASE$&' to'
2640 END DEFine
2650 DEFine FuNction inter$
2660 BEEP 2000,0:RETurn 'INTERCEPTOR 1 to '
2670 END DEFine
2680 DEFine FuNction attack$
2690 BEEP 2000,0,20,100,1:RETurn CALLSIGN$&'
to'
2700 END DEFine
2710 DEFine PROCedure shootdown
2720 controls:COCKPIT
2730 CLS
2740 BORDER 1,4:BORDER 0
2750 FILL 0:FOR star=1 TO 50:POINT
RND(120),RND(100)
2760 across=RND(120)
2770 up=RND(100)
2780 distance=INT(d3*200)
2790 INK 4
2800 centre
2810 CIRCLE_R 0,0,5:LINE_R 0,10 TO 0,-20,-10,10
TO 20,0
2820 INK 7
2830 BEEP 0,200,250,9,1
2840 REPeat aim
2850 show
2860 AT#5,3,0:PRINT#5;HEIGHT
2870 AT#5,8,7:PRINT#5,INT(distance);' '
2880 AT#5,13,0:PRINT#5;HEIGHT-50+up
2890 K=CODE(INKEY$(0))
2900 show
2910 SELect ON K
2920 =192:change 4:across=across+1
2930 =200:change 6:across=across-1
2940 =208:change 3:up=up-1:HEIGHT=HEIGHT+1
2950 =216:change 7:up=up+1:HEIGHT=HEIGHT-1
2960 =32:IF hit:EXIT aim
2970 END SELect
2980 across=across+RND(2)-1
2990 up=up+RND(2)-1
3000 distance=distance+(SPEED-600)/5
3010 limit distance,500,9999
3020 limit across,0,120
3030 limit up,0,99
3040 IF K=0:change 5
3050 END REPeat aim
3060 CLS#3:channels:grid:menu
3070 END DEFine
3080 DEFine PROCedure show
3090  OVER -1:FILL 1
3100  CIRCLE across,up,5000/distance,.2,PI/2
3110  OVER 0:FILL 0
3120 END DEFine
3130 DEFine FuNction hit
3140  CLS#0::PRINT#0;inter$!BASE$\'Target in
sight Launching missiles...':BEEP 0,99,150,9,10
3150  FOR mis=0 TO 50 STEP 5
3160   show
3170   missiles
3180   show
3190   across=across+RND(2)-1
3200   up=up+RND(2)-1
3210   missiles
3220  END FOR mis
3230  IF dist(across,up,60,50)<10
3240   PRINT#0;,'Target destroyed'
3250   FOR ex=5 TO 90 STEP 2:centre:CIRCLE_R
0,0,ex:BEEP 999,ex
3260 IF status=0:sc=sc+500:ELSE :MURDER
3270   RETurn 1
3280   ELSE
3290   BEEP 0,200,250,9,1:PRINT#0;,'Missiles
Missed':RETurn 0
3300  END IF
3310 END DEFine
3320 DEFine PROCedure missiles
3330  OVER -1
3340  LINE 110-mis,mis
3350  LINE_R TO 3,-3
3360  LINE 10+mis,mis
3370  LINE_R TO -3,-3
3380  OVER 0
3390 END DEFine
3400 DEFine PROCedure limit(var,min,max)
3410  IF var<min:var=min
3420  IF var>max:var=max
3430 END DEFine
3440 DEFine PROCedure controls
3450  CLS#4
3460  PRINT#4;\\\\'> CLIMB'\\'< BANK LEFT'\\'
FIRE'\\'= BANK RIGHT'\\'? DIVE'
3470  C=5
3480  HILIGHT
3490 END DEFine
3500 DEFine PROCedure COCKPIT
3510  CLS#5
3520  PRINT#5,'INTERCEPTOR'\\'Height:
(ft)'\\\'Speed; (mph)'\600\'-------------
'\'RANGE: '\'-------------'\'TARGET'\\'Height:
(ft)'\\\'Speed: (mph)'\SPEED
3530 END DEFine
```

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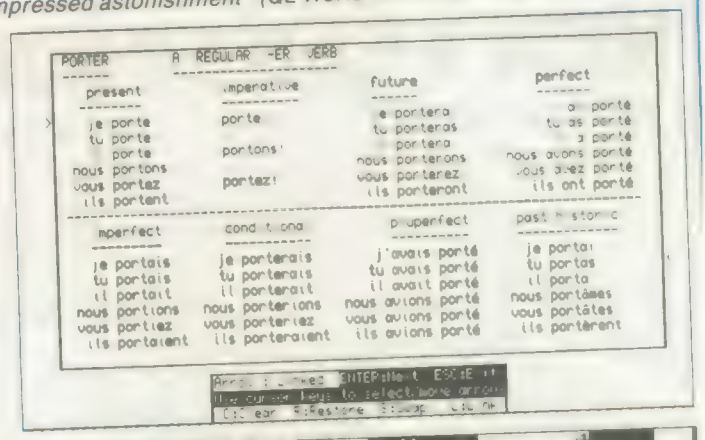

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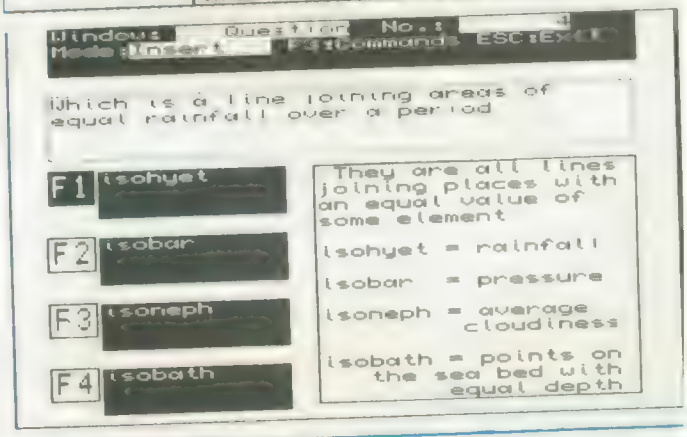

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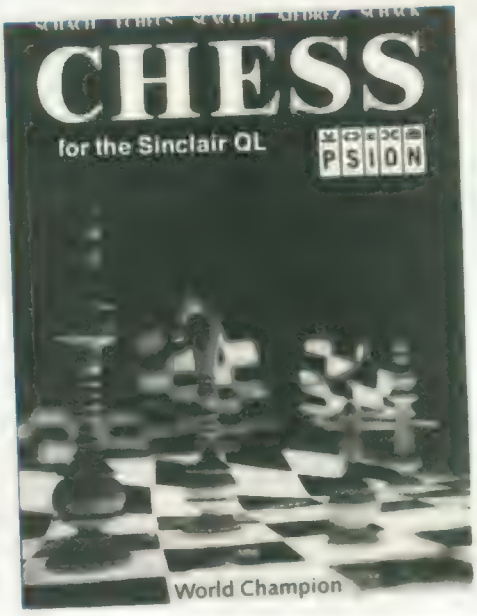

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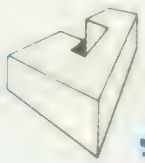

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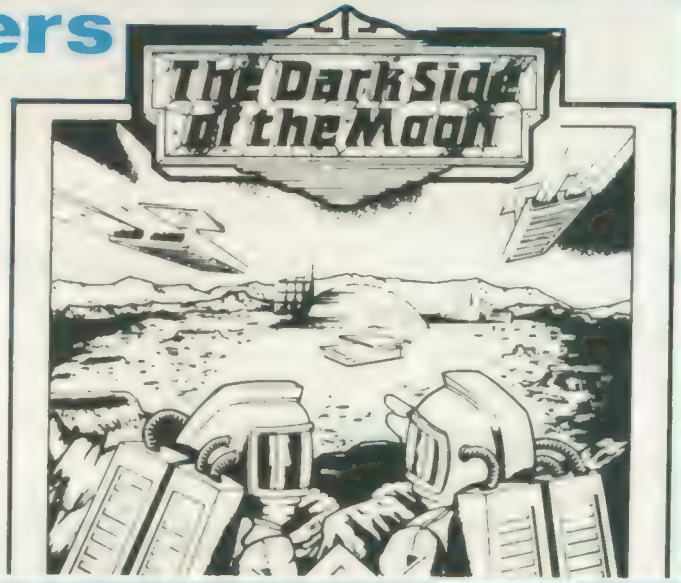

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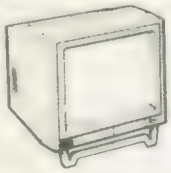

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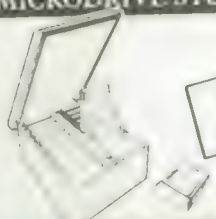

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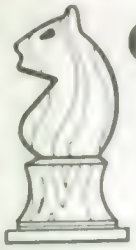

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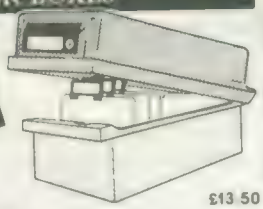

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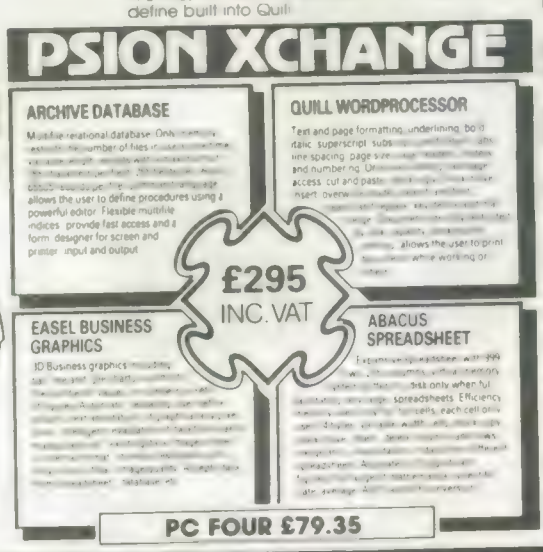
A cut-down version of Xchange as supplied on the QL but with the added facility of 65,535 entries in Archive, 999 lines in Abacus & mail merge plus key define built into Quill

PSION XCHANGE



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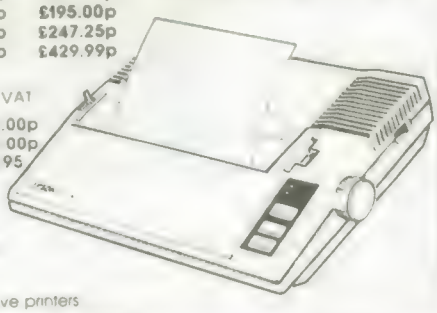

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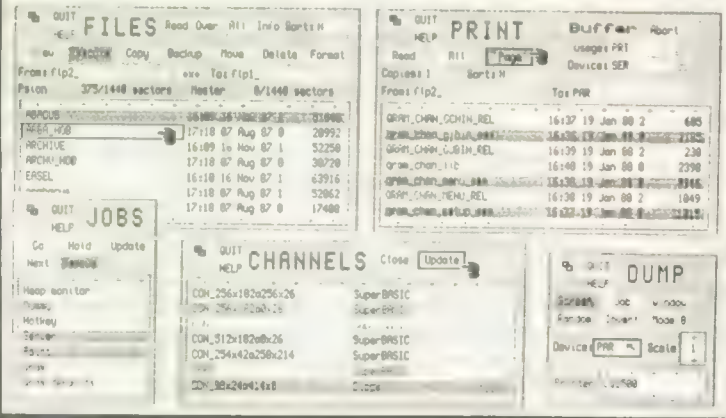
VISA

The QJUMP Pointer Interface software is the core of our development plans for the QL. This is the new standard in multi-windowing environments. It gives you mouse, cursor key or single keystroke control of your QL. Only QJUMP brings you a complete new environment for your expanded QL, providing non-destructive windows for any well written program (and most badly written ones too!) menus to set up, no silly imitations, just CTRL-C to switch between programs. This is the way forward for QL users, while most software will work with it, the best of the new software coming will not work without it. Three other QL software suppliers have already adopted it. QRAM and QPTR both use the Pointer Interface, but if you want to write your own programs to use it then QPTR is the package for you.

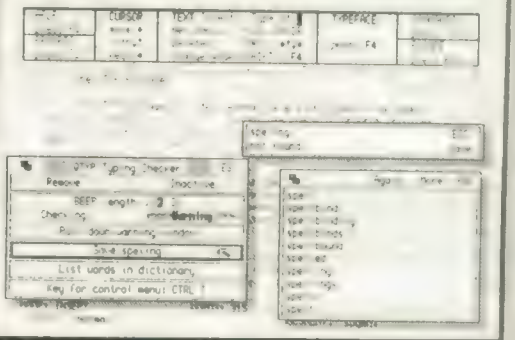
QRAM is the basis for any QL Pointer Interface system.

QRAM is the RAM based utilities package designed to get the best out of any QL with RAM expansion. QRAM has a range of facilities unparalleled by any other QL front end or control system. The QRAM menus pop up at the touch of a key to provide instant access control of your QL's FILES, PRINTER, JOBS and CHANNELS, and instant screen dumps to a wide variety of printers.



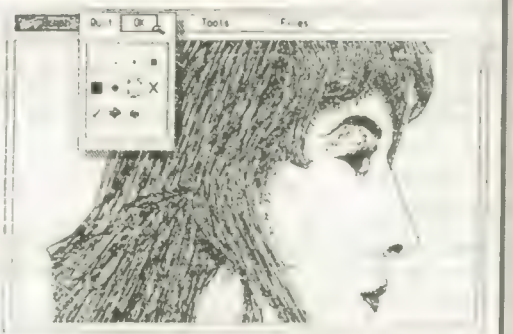
QTYP is the typing checker for the QL

QTYP can check as you type, or you can run your (almost!) finished document through it as a final check. Pop-up windows advise you of unknown words, suggest correct spellings given partial words, and warn you about difficult words (do they get easier with practise or practice?). You can even use QTYP's dictionary from within your own programs. QTYP has a 45,000 word English dictionary, which you can extend or edit. Deutsch version is now available.



QPTR is the ultimate QL windowing toolkit.

QPTR gives programmers the chance to use the QJUMP Pointer Environment, a set of utilities and extensions to the QL's screen driver, that provides pointer input, non-destructive windows, graphics objects and menu support. A 150-page manual documents how to use all these facilities, from both SuperBASIC and machine code programs. Four demonstration programs are provided, giving examples to study and modify. One is written in both SuperBASIC and assembler (source supplied), showing how a program may be "hand compiled" once you have it working in SuperBASIC. There is a Paint program, written in SuperBASIC so you can add to it yourself; for a program written to test the Pointer Toolkit, we think it compares rather well with some of the other painting programs available! You don't need a mouse to use QPTR, menus can be used with the cursor keys or by single keystrokes, but you can add QIMI to your system at any time without having to alter any of your software. SuperBASIC programs using QPTR may be compiled using Q_Liberator.



QIMI

QIMI is the Internal Mouse Interface from QJUMP. The QJUMP Pointer Interface automatically detects the Internal Mouse Interface so no changes are needed for any programs which use the QJUMP Pointer Interface. QIMI is the only mouse interface which leaves all of the QL's expansion facilities free for other peripherals. QIMI fits right inside the QL and is supplied with tools. QIMI works with ATARI compatible mice, which we can supply.

+RTC is now available for keep the QL's Real Time Clock running when your QL is turned off. Not just the simple battery as supplied by others: that was too unreliable for Sinclair to give away! +RTC incorporates a turn-on glitch suppression circuit which has been shown to improve the reliability of "bad" clocks by more than 50 times. Only available with QIMI or as an upgrade to QIMI.

Other QJUMP Products

QTK II is the SuperToolkit II. The "clear market leader" (QL World) in Toolkit ROMs. Why buy separate keydefine programs, job control utilities, default directory utilities etc. when QTK II has them all and more? "Jedem ernsthaften QL-Anwender zu empfehlen" (Computer Kontact).

QMON II is the QL Monitor/Debugger with single line assembler/disassembler, normal as well as conditional breakpoints, trace and backtrace, search, macro commands, transient windows and full window memory editor and much much more. "Das absolute Spitzenproduct" (68000er), can we say more?

QEP III is the "Rolls Royce" (Sinclair User) of EPROM programmers; "the finest EPROM programmer I have used" (Sinclair QL World) and many QLs have been bought just to use QEP III. Programs EPROMs 2716 to 27512, NMOS or CMOS. Features high and low voltage verification. Too many facilities to describe here, it puts £1000 EPROM programmers to shame.

QFLP disk driver upgrade ROMs are available for Medic System cartridges (gets round many of the faults on some of the early Medic disk drives) and MicroPeripherals, version 3 or version 5 (provides compatibility with the rest of the QL world, improves performance and adds many Toolkit commands).

QRAM	available on Mdv/3.5/5.25		£29.90 (£26.00 export)
QTYP	available on Mdv/3.5/5.25		£29.90 (£26.00 export)
QPTR	available on Mdv/3.5/5.25		£29.90 (£26.00 export)
QTK II	available on ROM/Mdv/3.5/5.25		£29.90 (£26.00 export)
QMON II	available on Mdv/3.5/5.25		£19.95 (£17.35 export)
QFLP	for Medic, MP ver3 and ver5		£14.95 (£13.00 export)
QEP III			£129.95 (£113.00 export)
QIMI	£29.90 (£26.00 export)	+RTC	£39.90 (£34.70 export)
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QJUMP

MICRODRIVE

THE PROGRAMS

1. Giles Todd B **DIY Assembler** £5

Featured in the March to June 1985 issues of *QL User*, this complete two-pass assembler will assemble all 68008 code and support the assembler directives DRG, END, EQU, DC and DS.

---

2. Richard Cross A + O **Mini Monitor** £3

Using approximately 3K of RAM, this utility multi-tasks on your QL, leaving plenty of room for other programs. Commands include dumping registers, memory and ASCII machine code trace, register store, memory move, memory store — byte, word and long — and jumps. *QL User*, October 1985.

---

4. Shergold & Tose B **Golf** £2

With up to 50 courses of varying difficulty, lakes, rivers, bunkers and trees. You decide the power and direction of each stroke, striving for a birdie, eagle or even an albatross. Your scorecard may be saved. *QL User*, May 1985.

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5. Williams & Holliday A + O **Paladin** £5

Written completely in machine code, this excellent *Space Invaders* game was the basis of our games programming series, started in April 1985.

---

7. Steve Deary B **Pacman** £1

Almost 20 screens of increasing difficulty, including an invisible maze, make it a very versatile rendition of the arcade favourite. *QL User*, March 1985.

---

8. Andy Carmichael B **Family Tree** £3

An Archive program and database for setting-up and displaying large family trees. *QL User*, August 1985.

---

9. James Lucy L **Composer** £3

Completed in *QL User*, October 1985, this QLiberated program will allow you to compose, play and edit music. The program will handle sharps, vary tempo, and specify staccato and legato playing styles.

---

13. S J Ackers S **Touch Type** £4

This program has a 13-lesson course for typing letters, words and phrases, a 700-word vocabulary, an interactive keyboard display and a fingering chart as more than 30K of code. Scores are based on the speed and accuracy of typing. a reduced version was printed in the August 1985 issue.

---

17. Tony Quinn S **CAD QL** £4

CAD design programs are particularly suited to the QL. This version includes rubber-banding and a user-definable symbol library. *QL World*, September 1988.

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19. Karl Jeffrey M + B **Starport 2001** £3

Fast machine code action in this version of the *Galaxians* arcade game. *QL World*, November 1986.

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24. J F Tydeman S **Design 3D** £4

3D screen designs with the minimum of fuss and aggravation. *QL World*, March/April 1987.

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25. D Carmona B **Stellaris** £4

This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics. *QL World*, June 1987.

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29. Peter Etheridge B **Bridge** £4

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and more.

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31. B Otridge **Crossword** £5

Originally a commercial program, this is the perfect aid for crossword fanatics: access by word length to a dictionary of about 12,500 words, to help solve those elusive clues. This program requires two Microdrive cartridges.

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32. Phillip Sproston B **Advent2** £4

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

---

33. Leslie Fahidy B **Clock** £

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. An on-screen clock can be used to set or read the time.

---

34. E Bamber **QL Converson/ Calculator** £

Weights and measures units, conventions and reverse Polish calculation, this utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

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35. John Wakefield B **Qwhist** £

Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents. *QL World*, August 1987.

---

36. Stanley Sykes B **Mail Merge**

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. Includes a demonstration

EXCHANGE

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	M+B	=	machine code and Basic Loader	L	=	QLiberate

37. P G Ives — B — The Double — £4

A large strategy game in which you manage a football team through four league divisions; features buying and selling, team line-up, morale, and so on, through the league and F.A. Cup season. Includes full instructions.

38. Leslie Fahidy — B — Education — £2

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

39. J F Tydeman — S — Design 3D — £4

A large suite of graphics and filing utilities for the production of 2D and 3D graphics, with instructions in the form of a Quill document. *QL World*, March 1987.

40. Santiago Rubio — B — Roulette — £3

A Spanish/English version of the traditional gambling game; includes the Leigh Pattern, a system to break the bank. *QL World*, September 1987.

41. Leslie Fahidy — B — Money — £2

An educational shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

42. Neil Davidson — A + B + O — Life — £2

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

43. Alan Glassbrook — S — Ian Swinton Qsquidge — £2

An arcade hunt through an 8x8 grid expandable series of rooms for the nine parts of Squidge's rocket. *QL World*, October 1987.

44. David March — B — Compress — £2

Utility to compress SuperBasic program files into a more compact form without losing the structure of the program.

45. Ronnie Davidson — M + B — SuperBreakout — £2

A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Optional double bats and/or balls.

46. Norman Marks — B — Navigator — £2

To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of locations. The calculation formulae can be seen from within the program.

47. Richard Clements — B — 3D Maze — £2

Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

48. Jason Price — B — Yahtzee — £2

The popular dice game. On-screen graphics make the two-player program enjoyable and easy to use. *QL World*, November 1987.

50 Jay Lewington — B — Bank — £4

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With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough please send them for review.

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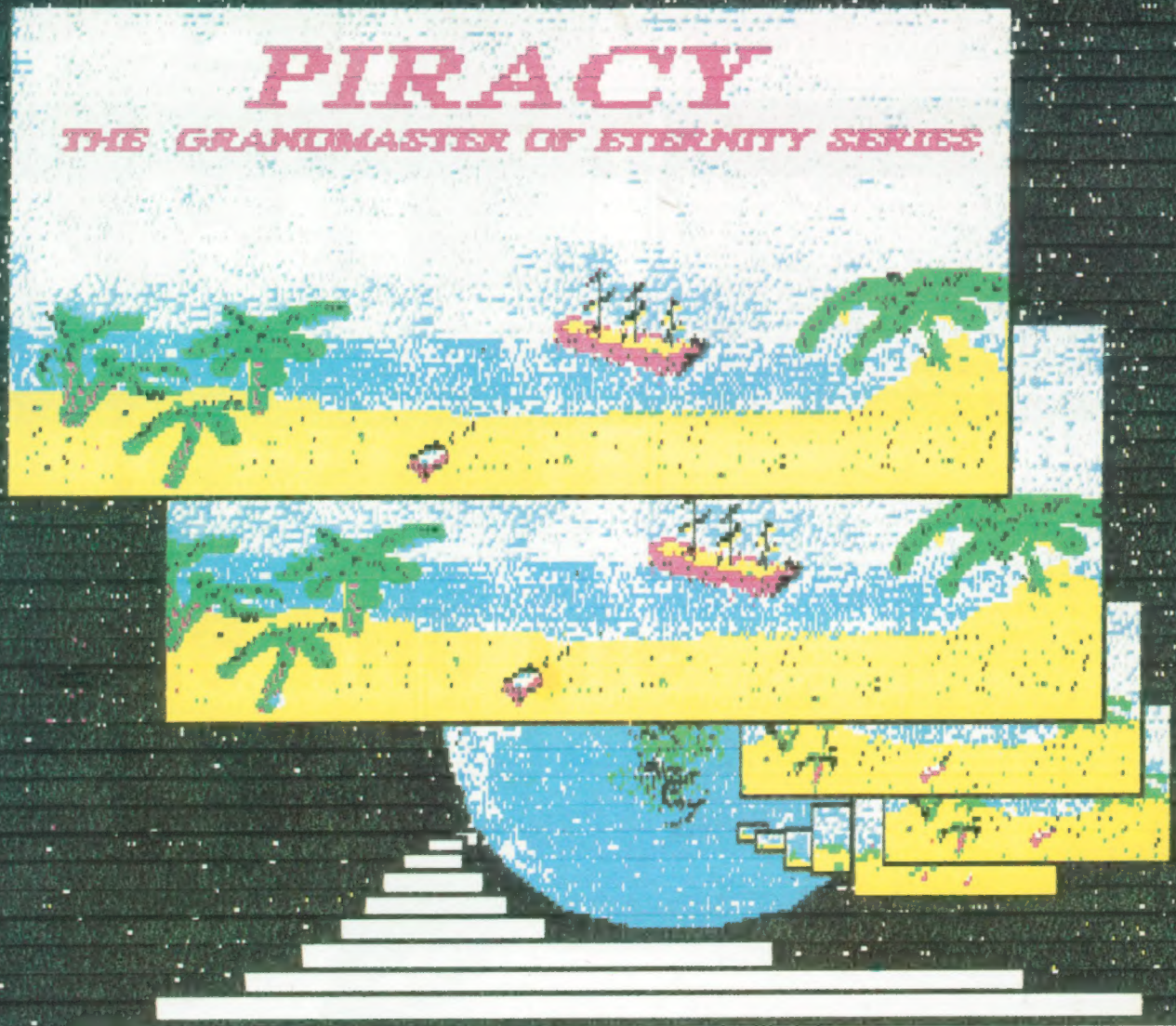

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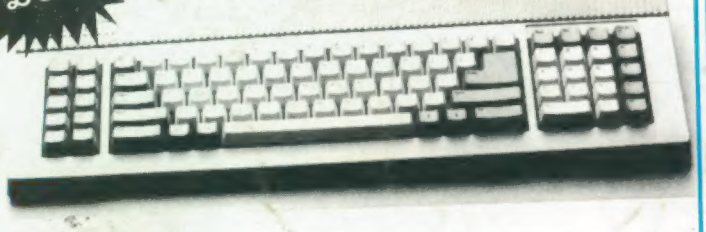

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